MULTI-STEP BIDDING PROCESS
FOR
CONTRACTORS

Request For Bids For Construction Services
Stage II – Mechanical Contractors Bidder's List
Invitation to Bid

May 1, 2006

BUILDING NO. 4 - GALVANIZED PIPE REPLACEMENT - PHASE II

WEBER STATE UNIVERSITY
OGDEN, UTAH

DFCM Project No. 06052810

WHW Engineering
1354 East 3300 South #200
Salt Lake City, Utah 84106

TABLE OF CONTENTS

Current copies of the following documents are hereby made part of these contract documents by reference. These documents are available on the DFCM web site at http://dfcm.utah.gov or are available upon request from DFCM:

DFCM General Conditions dated May 25, 2005
DFCM Application and Certificate for Payment dated May 25, 2005

Technical Specifications:
Drawings:

The Agreement and General Conditions dated May 25, 2005 have been updated from versions that were formally adopted and in use prior to this date. The changes made to the General Conditions are identified in a document entitled Revisions to General Conditions that is available on DFCM's web site at http://dfcm.utah.gov

INVITATION TO BID

Only firms pre-qualified during Stage I of this RFS and firms from DFCM's list of pre-qualified contractors that have completed the registration and certification form for this project are allowed to participate in Stage II.

The State of Utah - Division of Facilities Construction and Management (DFCM) is requesting bids for the construction of the following project:

BUILDING NO. 4 - GALVANIZED PIPE REPLACEMENT – PHASE II
WEBER STATE UNIVERSITY – OGDEN, UTAH
Project No: 06052810

Project Description: Install steam, return condensate, and domestic water piping systems to the upper floor of Building No. 4. Construction Cost Estimate: $350,000.00

FIRM NAME	POINT OF CONTACT	PHONE	FAX
A.H. Palmer	Mr. Val Palmer	(435) 752-4814	(435) 752-6991
Alternative Mechanical Contractors	Mr. Ron White	(801) 261-8523	(801) 261-8561
Envision Mechanical, Inc	Mr. Ray Squier	(801) 731-8060	(801) 731-8070
KOH Mechanical Contractors	Mr. Larry Hansen	(801) 254-7013	(801) 254-6374
Ralph Tye and Sons, Inc.	Mr. Doug Tye	(801) 262-9900	(801) 262-1391
S.R. Mechanical, Inc.	Mr. Steven Roberts	(435) 529-7492	(435) 529-7851
Tod R. Packer Heating & Air	Mr. Tod R. Packer	(801) 968-2255	(801) 849-1314

The bid documents will be available on Monday, May 1, 2006 in electronic format from DFCM at 4110 State Office Building, Salt Lake City, Utah 84114, telephone (801)538-3018 and on the DFCM web page at http://dfcm.utah.gov. For questions regarding this project, please contact Bob Anderson, Project Manager, DFCM, at (801)652-6754. No others are to be contacted regarding this project.

A **MANDATORY** pre-bid meeting and site visit will be held at 2:00 PM on Thursday, May 4, 2006 at Building No. 4, Weber State University, Ogden, Utah. Meet at the north doors. All registered pre-qualified prime contractors wishing to bid on this project must attend this meeting.

Bids must be submitted by 3:00 PM on Tuesday, May 16, 2006 to DFCM, 4110 State Office Building, Salt Lake City, Utah 84114. Bids will be opened and read aloud in the DFCM Conference Room, 4110 State Office Building, Salt Lake City, Utah. Note: Bids must be received at 4110 State Office Building by the specified time. The contractor shall comply with and require all of its subcontractors to comply with the license laws as required by the State of Utah.

A bid bond in the amount of five percent (5%) of the bid amount, made payable to the Division of Facilities Construction and Management on DFCM's bid bond form, shall accompany the bid.

The Division of Facilities Construction & Management reserves the right to reject any or all bids or to waive any formality or technicality in any bid in the interest of the State.

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
MARLA WORKMAN, CONTRACT COORDINATOR
4110 State Office Bldg., Salt Lake City, Utah 84114

STAGE II - MULTI-STEP BIDDING PROCESS

Only firms pre-qualified during Stage I of this RFS and firms from DFCM's list of pre-qualified contractors that have completed the registration and certification form for this project are allowed to participate in Stage II.

1. Invitational Bid Procedures

The following is an overview of the invitational bid process. More detailed information is contained throughout the document. Contractors are responsible for reading and complying with all information contained in this document.

Notification: DFCM will notify each registered pre-qualified firm (via fax or e-mail) when a project is ready for Construction Services and invite them to bid on the project.

Description of Work: A description of work or plans/specifications will be given to each contractor. If required, the plans and specifications will be available on the DFCM web page at http://dfcm.utah.gov and on CD's from DFCM, at 4110 State Office Building, Salt Lake City, Utah 84114.

Schedule: The Stage II Schedule shows critical dates including the mandatory pre-bid site meeting (if required), the question and answer period, the bid submittal deadline, the subcontractor list submittal deadline, etc. Contractors are responsible for meeting all deadlines shown on the schedule.

Mandatory Pre-Bid Site Meeting: If a firm fails to attend a pre-bid site meeting labeled "Mandatory" they will not be allowed to bid on the project. At the mandatory meeting, contractors may have an opportunity to inspect the site, receive additional instructions and ask questions about project. The schedule contains information on the date, time, and place of the mandatory pre-bid site meeting.

Written Questions: All questions must be in writing and directed to DFCM's project manager assigned to this project. No others are to be contacted regarding this project. The schedule contains information on the deadline for submitting questions.

Addendum: All clarifications from DFCM will be in writing and issued as an addendum to the RFS. Addenda will be posted on DFCM's web site at http://dfcm.utah.gov. Contractors are responsible for obtaining information contained in each addendum from the web site. Addenda issued prior to the submittal deadline shall become part of the bidding process and must be acknowledged on the bid form. Failure to acknowledge addenda may result in disqualification from bidding.

Submitting Bids: Bids must be submitted to DFCM 4110 State Office Building, Salt Lake City, Utah 84114 by the deadline indicated on the schedule. Bids submitted after the deadline will not be accepted. Bids will be opened at DFCM on the date, time, and place indicated on the schedule.

Subcontractors List: The firm selected for the project must submit a list of all subcontractors by the deadline indicated on the schedule contained in this document.

Pre-qualified List of Contractors: Contractors shall remain on DFCM's list of pre-qualified contractors provided: (a) they maintain a performance rating of 4 or greater on each project, (b) they are not suspended for failure to comply with requirements of their contract, (c) the firm has not undergone a significant reorganization involving the loss of key personnel (site superintendents, project managers, owners, etc.) to a degree such that the firm no longer meets the pre-qualification requirements outlined in Stage I, (d) the financial viability of the firm has not significantly changed, and (e) the firm is not otherwise disqualified by DFCM. Contractors previously pre-qualified will remain on DFCM's list of

Invitational Bid Procedures - Continued

pre-qualified contractors this year and are NOT required to pre-qualify in Stage I of this Request provided they submit the registration and certification form by the deadline in Stage I and are in compliance with items (a) through (e) above. Note: If a contractor fails to comply with items (a) through (e) above, they may be removed from DFCM's list of pre-qualified contractors following an evaluation by a review committee. Contractors will be given the opportunity to address the review committee before a decision is made. Pre-qualified contractors are ONLY authorized to bid on projects within the discipline that they were originally pre-qualified under.

2. Drawings and Specifications and Interpretations

Drawings, specifications and other contract documents may be obtained as stated in the Invitation to Bid. If any firm is in doubt as to the meaning or interpretation of any part of the drawings, specifications, scope of work or contract documents, they shall submit, in writing, a request for interpretation to the authorized DFCM representative by the deadline identified in the schedule. Answers to questions and interpretations will be made via addenda issued by DFCM. Neither DFCM or the designer shall be responsible for incorrect information obtained by contractors from sources other than the official drawings/specifications and addenda issued by DFCM.

3. Product Approvals

Where reference is made to one or more proprietary products in the contract documents, but restrictive descriptive materials of one or more manufacturer(s) is referred to in the contract documents, the products of other manufacturers will be accepted, provided they equal or exceed the standards set forth in the drawings and specifications and are compatible with the intent and purpose of the design, subject to the written approval of the Designer. Such written approval must occur prior to the deadline established for the last scheduled addendum to be issued. The Designer's written approval will be included as part of the addendum issued by DFCM. If the descriptive material is not restrictive, the products of other manufacturers specified will be accepted without prior approval provided they are compatible with the intent and purpose of the design as determined by the Designer.

4. Addenda

All clarifications from DFCM will be in writing and issued as an addendum to the RFS. Addenda will be posted on DFCM's web site at http://dfcm.utah.gov. Contractors are responsible for obtaining information contained in each addendum from the web site. Addenda issued prior to the submittal deadline shall become part of the bidding process and must be acknowledged on the bid form. Failure to acknowledge addenda shall result in disqualification from bidding. DFCM shall not be responsible for incorrect information obtained by contractors from sources other than official addenda issued by DFCM.

5. Financial Responsibility of Contractors, Subcontractors and Sub-subcontractors

Contractors shall respond promptly to any inquiry in writing by DFCM to any concern of financial responsibility of the Contractor, Subcontractor or Sub-subcontractor. Failure to respond may result in suspension from DFCM's list of pre-qualified contractors.

6. Licensure

The Contractor shall comply with and require all of its Subcontractors to comply with the license laws as required by the State of Utah.

7. Time is of the Essence

Time is of the essence in regard to all the requirements of the contract documents.

8. Bids

Before submitting a bid, each bidder shall carefully examine the contract documents; shall visit the site of the work; shall fully inform themselves as to all existing conditions and limitations; and shall include in the bid the cost of all items required by the contract documents including those added via addenda. If the bidder observes that portions of the contract documents are at variance with applicable laws, building codes, rules, regulations or contain obvious erroneous or uncoordinated information, the bidder shall promptly notify the DFCM Project Manager prior to the bidding deadline. Changes necessary to correct these issues will be made via addenda issued by DFCM.

The bid, bearing original signatures, must be typed or handwritten in ink on the Bid Form provided in the procurement documents and submitted in a sealed envelope at the location specified by the Invitation to Bid prior to the published deadline for the submission of bids.

Bid bond security, in the amount of five percent (5%) of the bid, made payable to the Division of Facilities Construction and Management, shall accompany bid. THE BID BOND MUST BE ON THE BID BOND FORM PROVIDED IN THE PROCUREMENT DOCUMENTS IN ORDER TO BE CONSIDERED AN ACCEPTABLE BID.

If the bid bond security is submitted on a form other than DFCM's required bid bond form, and the bid security meets all other legal requirements, the bidder will be allowed to provide an acceptable bid bond by the close of business on the next business day following notification by DFCM of submission of a defective bid bond security. **A cashier's check cannot be used as a substitute for a bid bond.**

9. Listing of Subcontractors

Listing of Subcontractors shall be as summarized in the "Instructions and Subcontractor's List Form", included as part of the contract documents. The subcontractors list shall be delivered to DFCM or faxed to DFCM at (801)538-3677 within 24 hours of the bid opening. Requirements for listing additional subcontractors will be listed in the contract documents.

DFCM retains the right to audit or take other steps necessary to confirm compliance with requirements for the listing and changing of subcontractors. Any contractor who is found to not be in compliance with these requirements may be suspended from DFCM's list of pre-qualified contractors.

10. Contract and Bond

The Contractor's Agreement will be in the form provided in this document. The duration of the contract shall be for the time indicated by the project completion deadline shown on the schedule. The successful bidder, simultaneously with the execution of the Contractor's Agreement, will be required to furnish a performance bond and a payment bond, both bearing original signatures, upon the forms provided in the procurement documents. The performance and payment bonds shall be for an amount equal to one hundred percent (100%) of the Contract Sum and secured from a company that meets the requirements specified in the requisite forms. Any bonding requirements for Subcontractors will be specified in the Supplementary General Conditions.

11. Award of Contract

The Contract will be awarded as soon as possible to the lowest, responsive and responsible bidder, based on the lowest combination of base bid and acceptable prioritized alternates, provided the bid is reasonable, is in the interests of DFCM to accept and after applying the Utah Preference Laws in U.C.A. Title 63, Chapter 56. DFCM reserves the right to waive any technicalities or formalities in any bid or in the bidding. Alternates will be accepted on a prioritized basis with Alternate 1 being highest priority, Alternate 2 having second priority, etc. Alternates will be selected in prioritized order up to the construction cost estimate.

12. Right to Reject Bids

DFCM reserves the right to reject any or all Bids.

13. Withdrawal of Bids

Bids may be withdrawn on written request received from bidders within 24 hours after the bid opening if the contractor has made an error in preparing the bid.

14. DFCM Contractor Performance Rating

As a contractor completes each project, DFCM will evaluate project performance based on the enclosed "DFCM Contractor Performance Rating" form. The ratings issued on this project may affect the firm's "Pre-Qualified" status and their ability to obtain future work with DFCM.

PROJECT SCHEDULE
Stage II = Multi-Step Bidding Process

PROJECT NAME:	**BUILDING NO. 4 GALVANIZED PIPE REPLACEMENT – PHASE II WEBER STATE UNIVERSITY – OGDEN, UTAH**
DFCM PROJECT NO.:	**06052810**

Event	Day	Date	Time	Place
Stage II Bidding Documents Available	Monday	May 1, 2006	10:00 AM	DFCM, 4110 State Office Bldg, SLC, UT and DFCM web site *
Mandatory Pre-bid Site Meeting	Thursday	May 4, 2006	2:00 PM	Building No. 4 Weber State University Ogden, UT (meet on north side)
Last Day to Submit Questions	Monday	May 8, 2006	4:00 PM	DFCM, 4110 State Office Bldg, SLC, UT
Final Addendum Issued	Thursday	May 11, 2006	4:00 PM	DFCM web site*
Prime Contractors Turn in Bid and Bid Bond / Bid Opening in DFCM Conference Room	Tuesday	May 16, 2006	3:00 PM	DFCM, 4110 State Office Bldg, SLC, UT
Subcontractors List Due	Wednesday	May 17, 2006	3:00 PM	DFCM, 4110 State Office Bldg, SLC, UT
Project Completion Date	Friday	August 18, 2006	4:00 PM	

* DFCM's web site address is http://dfcm.utah.gov

BID FORM

NAME OF BIDDER _____ DATE _____

To the Division of Facilities Construction and Management
4110 State Office Building
Salt Lake City, Utah 84114

The undersigned, responsive to the "Notice to Contractors" and in accordance with the Request for Bids for the **BUILDING NO. 4 GALVANIZED PIPE REPLACEMENT PHASE II – WEBER STATE UNIVERSITY – OGDEN, UTAH - DFCM PROJECT NO. 06052810** and having examined the Contract Documents and the site of the proposed Work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of labor, hereby proposes to furnish all labor, materials and supplies as required for the Work in accordance with the Contract Documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the Work required under the Contract Documents of which this bid is a part:

I/We acknowledge receipt of the following Addenda: _____

For all work shown on the Drawings and described in the Specifications and Contract Documents, I/we agree to perform for the sum of:

_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

I/We guarantee that the Work will be Substantially Complete by **August 18, 2006** days after receipt of the Notice to Proceed, should I/we be the successful bidder, and agree to pay liquidated damages in the amount of **$500.00** per day for each day after expiration of the Contract Time as stated in Article 3 of the Contractor's Agreement.

This bid shall be good for 45 days after bid opening.

Enclosed is a 5% bid bond, as required, in the sum of _____

The undersigned Contractor's License Number for Utah is _____

Upon receipt of notice of award of this bid, the undersigned agrees to execute the contract within ten (10) days, unless a shorter time is specified in Contract Documents, and deliver acceptable Performance and Payment bonds in the prescribed form in the amount of 100% of the Contract Sum for faithful performance of the contract. The Bid Bond attached, in the amount not less than five percent (5%) of the above bid sum, shall become the property of the Division of Facilities Construction and Management as liquidated damages for delay and additional expense caused thereby in the event that the contract is not executed and/or acceptable l00% Performance and Payment bonds are not delivered within time set forth.

Type of Organization: _____
(Corporation, Partnership, Individual, etc.)

Any request and information related to Utah Preference Laws:

_____

Respectfully submitted,

_____
Name of Bidder

ADDRESS:

_____

_____

_____
Authorized Signature

BID BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed, (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the STATE OF UTAH, hereinafter referred to as the "Obligee," in the amount of $_____ (5% of the accompanying bid), being the sum of this Bond to which payment the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted to Obligee the accompanying bid incorporated by reference herein, dated as shown, to enter into a contract in writing for the _____ _____ Project.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if the said principal does not execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the principal, then the sum of the amount stated above will be forfeited to the State of Utah as liquidated damages and not as a penalty; if the said principal shall execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the Principal, then this obligation shall be null and void. It is expressly understood and agreed that the liability of the Surety for any and all defaults of the Principal hereunder shall be the full penal sum of this Bond. The Surety, for value received, hereby stipulates and agrees that obligations of the Surety under this Bond shall be for a term of sixty (60) days from actual date of the bid opening.

PROVIDED, HOWEVER, that this Bond is executed pursuant to provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their several seals on the date indicated below, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

DATED this _____ day of _____, 20_____ .

Principal's name and address (if other than a corporation):

_____

_____

By: _____

Title: _____

Principal's name and address (if a corporation):

_____

_____

By: _____

Title: _____

(Affix Corporate Seal)

Surety's name and address:

_____

_____

STATE OF _____)
) ss.
COUNTY OF _____)

By: _____
Attorney-in-Fact (Affix Corporate Seal)

On this ____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.
My Commission Expires: _____
Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

INSTRUCTION AND SUBCONTRACTORS LIST FORM

The three low bidders, as well as all other bidders that desire to be considered, are required by law to submit to DFCM within 24 hours of bid opening a list of **ALL** first-tier subcontractors, including the subcontractor's name, bid amount and other information required by Building Board Rule and as stated in these Contract Documents, on the following basis:

PROJECTS UNDER $500,000 - ALL SUBS $20,000 OR OVER MUST BE LISTED
PROJECTS $500,000 OR MORE - ALL SUBS $35,000 OR OVER MUST BE LISTED

- Any additional subcontractors identified in the bid documents shall also be listed.
- The DFCM Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law.
- List subcontractors for base bid as well as the impact on the list that the selection of any alternate may have.
- Bidder may not list more than one subcontractor to perform the same work.
- Bidder must list "Self" if performing work itself.

LICENSURE:

The subcontractor's name, the type of work, the subcontractor's bid amount, and the subcontractor's license number as issued by DOPL, if such license is required under Utah Law, shall be listed. Bidder shall certify that all subcontractors, required to be licensed, are licensed as required by State law. A subcontractor includes a trade contractor or specialty contractor and does not include suppliers who provide only materials, equipment, or supplies to a contractor or subcontractor.

BIDDER LISTING 'SELF' AS PERFORMING THE WORK:

Any bidder that is properly licensed for the particular work and intends to perform that work itself in lieu of a subcontractor that would otherwise be required to be on the subcontractor list, must insert the term 'Self' for that category on the subcontractor list form. Any listing of 'Self' on the sublist form shall also include the amount allocated for that work.

'SPECIAL EXCEPTION':

A bidder may list 'Special Exception' in place of a subcontractor when the bidder intends to obtain a subcontractor to perform the work at a later date because the bidder was unable to obtain a qualified or reasonable bid under the provisions of U.C.A.Section 63A-5-208(4). The bidder shall insert the term 'Special Exception' for that category of work, and shall provide documentation with the subcontractor list describing the bidder's efforts to obtain a bid of a qualified subcontractor at a reasonable cost and why the bidder was unable to obtain a qualified subcontractor bid. The Director must find that the bidder complied in good faith with State law requirements for any 'Special Exception' designation, in order for the bid to be considered. If awarded the contract, the Director shall supervise the bidder's efforts to obtain a qualified subcontractor bid. The amount of the awarded contract may not be adjusted to reflect the actual amount of the subcontractor's bid. Any listing of 'Special Exception' on the sublist form shall also include amount allocated for that work.

GROUNDS FOR DISQUALIFICATION:

The Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law. Director may withhold awarding the contract to a particular bidder if one or more of the proposed subcontractors are considered by the Director to be unqualified to do the Work or for such other reason in the best interest of the State of Utah. Notwithstanding any other provision in these instructions, if there is a good faith error on the sublist form, at the sole discretion of the Director, the Director may provide notice to the contractor and the contractor shall have 24 hours to submit the correction to the Director. If such correction is submitted timely, then the sublist requirements shall be considered met.

CHANGES OF SUBCONTRACTORS SPECIFICALLY IDENTIFIED ON SUBLIST FORM:

Subsequent to twenty-four hours after the bid opening, the contractor may change its listed subcontractors only after receiving written permission from the Director based on complying with all of the following criteria.

(1) The contractor has established in writing that the change is in the best interest of the State and that the contractor establishes an appropriate reason for the change, which may include, but not is not limited to, the following reasons: the original subcontractor has failed to perform, or is not qualified or capable of performing, and/or the subcontractor has requested in writing to be released.
(2) The circumstances related to the request for the change do not indicate any bad faith in the original listing of the subcontractors.
(3) Any requirement set forth by the Director to ensure that the process used to select a new subcontractor does not give rise to bid shopping.
(4) Any increase in the cost of the subject subcontractor work is borne by the contractor.
(5) Any decrease in the cost of the subject subcontractor work shall result in a deductive change order being issued for the contract for such decreased amount.
(6) The Director will give substantial weight to whether the subcontractor has consented in writing to being removed unless the Contractor establishes that the subcontractor is not qualified for the work.

EXAMPLE:

Example of a list where there are only four subcontractors:

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #
ELECTRICAL	ABCD Electric Inc.	$350,000.00	123456789000
LANDSCAPING	"Self"	300,000.00	123456789000
CONCRETE (ALTERNATE #1)	XYZ Concrete Inc	298,000.00	987654321000
MECHANICAL	"Special Exception" (attach documentation)	Fixed at: 350,000.00	(TO BE PROVIDED AFTER OBTAINING SUBCONTRACTOR)

PURSUANT TO STATE LAW - SUBCONTRACTOR BID AMOUNTS CONTAINED IN THIS SUBCONTRACTOR LIST SHALL NOT BE DISCLOSED UNTIL THE CONTRACT HAS BEEN AWARDED.

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

SUBCONTRACTORS LIST
FAX TO 801-538-3677

PROJECT TITLE: _____

Caution: You must read and comply fully with instructions.

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #

We certify that:

1. This list includes all subcontractors as required by the instructions, including those related to the base bid as well as any alternates.
2. We have listed "Self" or "Special Exception" in accordance with the instructions.
3. All subcontractors are appropriately licensed as required by State law.

FIRM: _____

DATE: _____ SIGNED BY: _____

NOTICE: FAILURE TO SUBMIT THIS FORM, PROPERLY COMPLETED AND SIGNED, AS REQUIRED IN THESE CONTRACT DOCUMENTS, SHALL BE GROUNDS FOR DFCMS REFUSAL TO ENTER INTO A WRITTEN CONTRACT WITH BIDDER. ACTION MAY BE TAKEN AGAINST BIDDERS BID BOND AS DEEMED APPROPRIATE BY DFCM. ATTACH A SECOND PAGE IF NECESSARY.

FUGITIVE DUST PLAN

The Contractor will fill out the form and file the original with the Division of Air Quality and a copy of the form with the Division of Facilities Construction & Management, prior to the issuance of any notice to proceed.

The Contractor will be fully responsible for compliance with the Fugitive Dust Control Plan, including the adequacy of the plan, any damages, fines, liability, and penalty or other action that results from noncompliance.

Utah Division of Air Quality
April 20, 1999

GUIDANCE THAT MUST BE CONSIDERED IN DEVELOPING AND SUBMITTING A DUST CONTROL PLAN FOR COMPLIANCE WITH R307-309-3, 4, 5, 6, 7

Source Information:

1. Name of your operation (source): provide a name if the source is a construction site.

2. Address or location of your operation or construction site.

3. UTM coordinates or Longitude/Latitude of stationary emission points at your operation.

4. Lengths of the project, if temporary (time period).

5. Description of process (include all sources of dust and fugitive dust). Please, if necessary, use additional sheets of paper for this description. Be sure to mark it as an attachment.

6. Type of material processed or disturbed.

7. Amount of material processed (tons per year, tons per month, lbs./hr., and applicable units).

8. Destination of product (where will the material produced be used or transported, be specific, provide address or specific location), information needed for temporary relocation applicants.

9. Identify the individual who is responsible for the implementation and maintenance of fugitive dust control measures. List name(s), position(s) and telephone number(s).

10. List, and attach copies of any contract lease, liability agreement with other companies that may, or will, be responsible for dust control on site or on the project.

Description of Fugitive Dust Emission Activities
(Things to consider in addressing fugitive dust control strategies.)

1. Type of activities (drilling and blasting, road construction, development construction, earth moving and excavation, handling and hauling materials, cleaning and leveling, etc).

2. List type of equipment generating the fugitive dust.

3. Diagram the location of each activity or piece of equipment on site. Please attach the diagram.

4. Provide pictures or drawings of each activity. Include a drawing of the unpaved/paved road network used to move loads "on" and "off" property.

5. Vehicle miles travels on unpaved roads associated with the activity (average speed).

6. Type of dust emitted at each source (coal, cement, sand, soil, clay, dust, etc.)

7. Estimate the size of the release area at which the activity occurs (square miles). For haul or dirt roads include total miles of road in use during the activity.

Description of Fugitive Dust Emission Controls on Site

Control strategies must be designed to meet 20% opacity or less on site (a lesser opacity may be defined by Approval Order conditions or federal requirements such as NSPS), and control strategies must prevent exceeding 10% opacity from fugitive dust at the property boundary (site boundary) for compliance with R307-309-3.

1. Types of ongoing emission controls proposed for each activity, each piece of equipment, and haul roads.

2. Types of additional dust controls proposed for bare, exposed surfaces (chemical stabilization, synthetic cover, wind breaks, vegetative cover, etc).

3. Method of application of dust suppressant.

4. Frequency of application of dust suppressant.

5. Explain what triggers the use of a special control measure other than routine measures already in place, such as covered loads or measures covered by a permit condition (increase in opacity, high winds, citizen complaints, dry conditions, etc).

6. Explain in detail what control strategies/measures will be implemented off-hours, i.e., Saturdays/Sundays/Holidays, as well as 6 PM to 6 AM each day.

Description of Fugitive Dust Control Off-site

Prevent, to the maximum extent possible, deposition of materials, which may create fugitive dust on public and private paved roads in compliance with R307-309-5, 6, 7.

1. Types of emission controls initiated by your operation that are in place "off" property (application of water, covered loads, sweeping roads, vehicle cleaning, etc.).

2. Proposed remedial controls that will be initiated promptly if materials, which may create fugitive dust, are deposited on public and private paved roads.

Submit the Dust Control Plan to:

Executive Secretary
Utah Air Quality Board
POB 144820
15 North 1950 West
Salt Lake City, Utah 84114-4820

Phone: (801) 536-4000
FAX: (801) 536-4099

Fugitive Dust Control Plan Violation Report

When a source is found in violation of R307-309-3 or in violation of the Fugitive Dust Control Plan, the course must submit a report to the Executive Secretary within 15 days after receiving a Notice of Violation. The report must include the following information:

1. Name and address of dust source.

2. Time and duration of dust episode.

3. Meteorological conditions during the dust episode.

4. Total number and type of fugitive dust activities and dust producing equipment within each operation boundary. If no change has occurred from the existing dust control plan, the source should state that the activity/equipment is the same.

5. Fugitive dust activities or dust producing equipment that caused a violation of R-307-309-3 or the sources dust control plan.

6. Reasons for failing to control dust from the dust generating activity or equipment.

7. New and/or additional fugitive dust control strategies necessary to achieve compliance with R307-309-3, 4, 5, 6, or 7.

8. If it can not be demonstrated that the current approved Dust Control Plan can result in compliance with R307-309-3 through 7, the Dust Control Plan must be revised so as to demonstrate compliance with 307-309-3 through 7. Within 30 days of receiving a fugitive dust Notice of Violation, the source must submit the revised Plan to the Executive Secretary for review and approval.

Submit the Dust Control Plan to:

Executive Secretary
Utah Air Quality Board
POB 144820
15 North 1950 West
Salt Lake City, Utah 84114-4820

Phone: (801) 536-4000
FAX: (801) 536-4099

Attachments: DFCM Form FDR R-307-309, Rule 307-309

CONTRACTOR'S AGREEMENT

FOR:

_____
_____
_____

THIS CONTRACTOR'S AGREEMENT, made and entered into this ____ day of _____, 20__, by and between the DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT, hereinafter referred to as "DFCM", and _____, incorporated in the State of _____ and authorized to do business in the State of Utah, hereinafter referred to as "Contractor", whose address is _____.

WITNESSETH: WHEREAS, DFCM intends to have Work performed at _____ _____.

WHEREAS, Contractor agrees to perform the Work for the sum stated herein.

NOW, THEREFORE, DFCM and Contractor for the consideration provided in this Contractor's Agreement, agree as follows:

ARTICLE 1. SCOPE OF WORK. The Work to be performed shall be in accordance with the Contract Documents prepared by _____ and entitled "_____."

The DFCM General Conditions ("General Conditions") dated May 25, 2005 on file at the office of DFCM and available on the DFCM website, are hereby incorporated by reference as part of this Agreement and are included in the specifications for this Project. All terms used in this Contractor's Agreement shall be as defined in the Contract Documents, and in particular, the General Conditions.

The Contractor Agrees to furnish labor, materials and equipment to complete the Work as required in the Contract Documents which are hereby incorporated by reference. It is understood and agreed by the parties hereto that all Work shall be performed as required in the Contract Documents and shall be subject to inspection and approval of DFCM or its authorized representative. The relationship of the Contractor to the DFCM hereunder is that of an independent Contractor.

ARTICLE 2. CONTRACT SUM. The DFCM agrees to pay and the Contractor agrees to accept in full performance of this Contractor's Agreement, the sum of _____ _____ DOLLARS AND NO CENTS ($_____.00), which is the base bid, and which sum also includes the cost of a 100%

Performance Bond and a 100% Payment Bond as well as all insurance requirements of the Contractor. Said bonds have already been posted by the Contractor pursuant to State law. The required proof of insurance certificates have been delivered to DFCM in accordance with the General Conditions before the execution of this Contractor's Agreement.

ARTICLE 3. TIME OF COMPLETION AND DELAY REMEDY. The Work shall be Substantially Complete within _____ (___) calendar days after the date of the Notice to Proceed. Contractor agrees to pay liquidated damages in the amount of $_____ per day for each day after expiration of the Contract Time until the Contractor achieves Substantial Completion in accordance with the Contract Documents, if Contractor's delay makes the damages applicable. The provision for liquidated damages is: (a) to compensate the DFCM for delay only; (b) is provided for herein because actual damages can not be readily ascertained at the time of execution of this Contractor's Agreement; (c) is not a penalty; and (d) shall not prevent the DFCM from maintaining Claims for other non-delay damages, such as costs to complete or remedy defective Work.

No action shall be maintained by the Contractor, including its or Subcontractor or suppliers at any tier, against the DFCM or State of Utah for damages or other claims due to losses attributable to hindrances or delays from any cause whatsoever, including acts and omissions of the DFCM or its officers, employees or agents, except as expressly provided in the General Conditions. The Contractor may receive a written extension of time, signed by the DFCM, in which to complete the Work under this Contractor's Agreement in accordance with the General Conditions.

ARTICLE 4. CONTRACT DOCUMENTS. The Contract Documents consist of this Contractor's Agreement, the Conditions of the Contract (DFCM General Conditions, Supplementary and other Conditions), the Drawings, Specifications, Addenda and Modifications. The Contract Documents shall also include the bidding documents, including the Notice to Contractors, Instructions to Bidders/Proposers and the Bid/Proposal, to the extent not in conflict therewith and other documents and oral presentations that are documented as an attachment to the contract.

All such documents are hereby incorporated by reference herein. Any reference in this Contractor's Agreement to certain provisions of the Contract Documents shall in no way be construed as to lessen the importance or applicability of any other provisions of the Contract Documents.

ARTICLE 5. PAYMENT. The DFCM agrees to pay the Contractor from time to time as the Work progresses, but not more than once each month after the date of Notice to Proceed, and only upon Certificate of the A/E for Work performed during the preceding calendar month, ninety-five percent (95%) of the value of the labor performed and ninety-five percent (95%) of the value of materials furnished in place or on the site. The Contractor agrees to furnish to the DFCM invoices for materials purchased and on the site but not installed, for which the

Contractor requests payment and agrees to safeguard and protect such equipment or materials and is responsible for safekeeping thereof and if such be stolen, lost or destroyed, to replace same.

Such evidence of labor performed and materials furnished as the DFCM may reasonably require shall be supplied by the Contractor at the time of request for Certificate of Payment on account. Materials for which payment has been made cannot be removed from the job site without DFCM's written approval. Five percent (5%) of the earned amount shall be retained from each monthly payment. The retainage, including any additional retainage imposed and the release of any retainage, shall be in accordance with UCA 13-8-5 as amended. Contractor shall also comply with the requirements of UCA 13-8-5, including restrictions of retainage regarding subcontractors and the distribution of interest earned on the retention proceeds. The DFCM shall not be responsible for enforcing the Contractor's obligations under State law in fulfilling the retention law requirements with subcontractors at any tier.

ARTICLE 6. INDEBTEDNESS. Before final payment is made, the Contractor must submit evidence satisfactory to the DFCM that all payrolls, materials bills, subcontracts at any tier and outstanding indebtedness in connection with the Work have been properly paid. Final Payment will be made after receipt of said evidence, final acceptance of the Work by the DFCM as well as compliance with the applicable provisions of the General Conditions.

Contractor shall respond immediately to any inquiry in writing by DFCM as to any concern of financial responsibility and DFCM reserves the right to request any waivers, releases or bonds from Contractor in regard to any rights of Subcontractors (including suppliers) at any tier or any third parties prior to any payment by DFCM to Contractor.

ARTICLE 7. ADDITIONAL WORK. It is understood and agreed by the parties hereto that no money will be paid to the Contractor for additional labor or materials furnished unless a new contract in writing or a Modification hereof in accordance with the General Conditions and the Contract Documents for such additional labor or materials has been executed. The DFCM specifically reserves the right to modify or amend this Contractor's Agreement and the total sum due hereunder either by enlarging or restricting the scope of the Work.

ARTICLE 8. INSPECTIONS. The Work shall be inspected for acceptance in accordance with the General Conditions.

ARTICLE 9. DISPUTES. Any dispute, PRE or Claim between the parties shall be subject to the provisions of Article 7 of the General Conditions. DFCM reserves all rights to pursue its rights and remedies as provided in the General Conditions.

ARTICLE 10. TERMINATION, SUSPENSION OR ABANDONMENT. This Contractor's Agreement may be terminated, suspended or abandoned in accordance with the General Conditions.

ARTICLE 11. DFCM'S RIGHT TO WITHHOLD CERTAIN AMOUNT AND MAKE USE THEREOF. The DFCM may withhold from payment to the Contractor such amount as, in DFCM's judgment, may be necessary to pay just claims against the Contractor or Subcontractor at any tier for labor and services rendered and materials furnished in and about the Work. The DFCM may apply such withheld amounts for the payment of such claims in DFCM's discretion. In so doing, the DFCM shall be deemed the agent of Contractor and payment so made by the DFCM shall be considered as payment made under this Contractor's Agreement by the DFCM to the Contractor. DFCM shall not be liable to the Contractor for any such payment made in good faith. Such withholdings and payments may be made without prior approval of the Contractor and may be also be prior to any determination as a result of any dispute, PRE, Claim or litigation.

ARTICLE 12. INDEMNIFICATION. The Contractor shall comply with the indemnification provisions of the General Conditions.

ARTICLE 13. SUCCESSORS AND ASSIGNMENT OF CONTRACT. The DFCM and Contractor, respectively bind themselves, their partners, successors, assigns and legal representatives to the other party to this Agreement, and to partners, successors, assigns and legal representatives of such other party with respect to all covenants, provisions, rights and responsibilities of this Contractor's Agreement. The Contractor shall not assign this Contractor's Agreement without the prior written consent of the DFCM, nor shall the Contractor assign any moneys due or to become due as well as any rights under this Contractor's Agreement, without prior written consent of the DFCM.

ARTICLE 14. RELATIONSHIP OF THE PARTIES. The Contractor accepts the relationship of trust and confidence established by this Contractor's Agreement and covenants with the DFCM to cooperate with the DFCM and A/E and use the Contractor's best skill, efforts and judgment in furthering the interest of the DFCM; to furnish efficient business administration and supervision; to make best efforts to furnish at all times an adequate supply of workers and materials; and to perform the Work in the best and most expeditious and economic manner consistent with the interests of the DFCM.

ARTICLE 15. AUTHORITY TO EXECUTE AND PERFORM AGREEMENT. Contractor and DFCM each represent that the execution of this Contractor's Agreement and the performance thereunder is within their respective duly authorized powers.

ARTICLE 16. ATTORNEY FEES AND COSTS. Except as otherwise provided in the dispute resolution provisions of the General Conditions, the prevailing party shall be entitled to reasonable attorney fees and costs incurred in any action in the District Court and/or appellate body to enforce this Contractor's Agreement or recover damages or any other action as a result of a breach thereof.

IN WITNESS WHEREOF, the parties hereto have executed this Contractor's Agreement on the day and year stated hereinabove.

CONTRACTOR: _____

_____
Signature Date

Title: _____

State of _____)
)
County of _____) _____
Please type/print name clearly

On this ____ day of _____, 20____, personally appeared before me, _____, whose identity is personally known to me (or proved to me on the basis of satisfactory evidence) and who by me duly sworn (or affirmed), did say that he (she) is the _____ (title or office) of the firm and that said document was signed by him (her) in behalf of said firm.

_____
Notary Public

(SEAL)

My Commission Expires _____

APPROVED AS TO AVAILABILITY OF FUNDS:

_____
Financial Manager, Date
Division of Facilities Construction and Management

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

_____
_____ Date
Manager -
Capital _____

APPROVED AS TO FORM:
ATTORNEY GENERAL
May 25, 2005
By: Alan S. Bachman
Asst Attorney General

APPROVED FOR EXPENDITURE:

_____
Division of Finance Date

PERFORMANCE BOND

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

That _____ hereinafter referred to as the "Principal" and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah, hereinafter referred to as the "Obligee, " in the amount of _____ _____ DOLLARS ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____, for the approximate sum of _____ _____ Dollars ($_____), which Contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall faithfully perform the Contract in accordance with the Contract Documents including, but not limited to, the Plans, Specifications and conditions thereof, the one year performance warranty, and the terms of the Contract as said Contract may be subject to Modifications or changes, then this obligation shall be void; otherwise it shall remain in full force and effect.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the state named herein or the heirs, executors, administrators or successors of the Owner.

The parties agree that the dispute provisions provided in the Contract Documents apply and shall constitute the sole dispute procedures of the parties.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the Provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20_____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____

(Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)

) ss.

COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney in-fact of the above-named Surety Company and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____

Resides at: _____

_____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

PAYMENT BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____ _____, a corporation organized and existing under the laws of the State of _____authorized to do business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); with its principal office in the City of _____, hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah hereinafter referred to as the "Obligee," in the amount of _____ Dollars ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____ for the approximate sum of _____ _____ Dollars ($_____), which contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall pay all claimants supplying labor or materials to Principal or Principal's Subcontractors in compliance with the provisions of Title 63, Chapter 56, of Utah Code Annotated, l953, as amended, and in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise it shall remain in full force and effect.

That said Surety to this Bond, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the Contract or to the Work to be performed thereunder, or the specifications or drawings accompanying same shall in any way affect its obligation on this Bond, and does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to the Work or to the specifications or drawings and agrees that they shall become part of the Contract Documents.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____

(Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____ _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____

Resides at: _____

_____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

CHANGE ORDER #_____

CONTRACTOR:

ARCHITECT:

AGENCY OR INSTITUTION:
PROJECT NAME:
PROJECT NUMBER:
CONTRACT NUMBER:
DATE:

CONSTRUCTION CHANGE DIRECTIVE NO.	PROPOSAL REQUEST NO.	AMOUNT		DAYS	
		INCREASE	DECREASE	INCREASE	DECREASE

	Amount	Days	Date
ORIGINAL CONTRACT			
TOTAL PREVIOUS CHANGE ORDERS			
TOTAL THIS CHANGE ORDER			
ADJUSTED CONTRACT			

DFCM and Contractor agree that the terms, contract sum, scope of the Work and time specified in this Change Order shall constitute the full accord and satisfaction, and complete adjustment to the Contract and includes all direct and indirect costs and effects related to, incidental to, and/or reasonably implied from such change in the contract terms, sum, scope of the Work and time.

Contractor:_____
Date

Architect/Engineer:_____
Date

Agency or Institution:_____
Date

DFCM: _____
Date

Funding Verification:_____
Date

Page _____ of _____page(s)

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT _____ PROJECT NO: _____

AGENCY/INSTITUTION _____

AREA ACCEPTED _____

The Work performed under the subject Contract has been reviewed on this date and found to be Substantially Completed as defined in the General Conditions; including that the construction is sufficiently completed in accordance with the Contract Documents, as modified by any change orders agreed to by the parties, so that the State of Utah can occupy the Project or specified area of the Project for the use for which it is intended.

The DFCM - (Owner) accepts the Project or specified area of the Project as Substantially Complete and will assume full possession of the Project or specified area of the Project at _____ (time) on _____ (date).

The DFCM accepts the Project for occupancy and agrees to assume full responsibility for maintenance and operation, including utilities and insurance, of the Project subject to the itemized responsibilities and/or exceptions noted below:

_____

_____

The Owner acknowledges receipt of the following closeout and transition materials:

☐ Record Drawings ☐ O & M Manuals ☐ Warranty Documents ☐ Completion of Training Requirements

A list of items to be completed or corrected (Punch List) is attached hereto. The failure to include an item on it does not alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents, including authorized changes thereof. The amount of_____. (Twice the value of the punch list work) shall be retained to assure the completion of the punch list work.

The Contractor shall complete or correct the Work on the list of (Punch List) items appended hereto within _____ ____calendar days from the above date of issuance of this Certificate. If the list of items is not completed within the time allotted the Owner has the right to be compensated for the delays and/or complete the work with the help of independent contractor at the expense of the retained project funds. If the retained project funds are insufficient to cover the delay/completion damages, the Owner shall be promptly reimbursed for the balance of the funds needed to compensate the Owner.

_____ by: _____

CONTRACTOR (include name of firm) (Signature) DATE

_____ by: _____

A/E (include name of firm) (Signature) DATE

_____ by: _____

USING INSTITUTION OR AGENCY (Signature) DATE

_____ by: _____

DFCM (Owner) (Signature) DATE

4110 State Office Building, Salt Lake City, Utah 84114
telephone 801-538-3018 • facsimile 801-538-3267 • http://dfcm.utah.gov

cc: Parties Noted
DFCM, Director

WEBER STATE UNIVERSITY
BUILDING 4 - 2ND FLOOR
STEAM, CONDENSATE & DOMESTIC WATER PIPING REPLACEMENT
OGDEN, UTAH

DFCM PROJECT # 06052810

State of Utah—Department of Administrative Services

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

4110 State Office Building / Salt Lake City, Utah 84114 / 538-3018

SPECIFICATIONS

PREPARED BY

WHW ENGINEERING INC.
1354 EAST 3300 SOUTH, SUITE 200
SALT LAKE CITY, UTAH 84106
PHONE: (801) 466-4021
FAX: (801) 466-8536

APRIL 2006

WHW ENGINEERING PROJECT #06004

INDEX

15700 HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT

15762 CONVECTORS
15765 CABINET UNIT HEATER

15900 HVAC INSTRUMENTATION AND CONTROLS

15935 FACILITY MANAGEMENT SYSTEM
15940 SEQUENCE OF OPERATION

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents.
2. Use of premises.
3. Owner's occupancy requirements.
4. Work restrictions.
5. Specification formats and conventions.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Weber State University - Building 4 - 2nd Floor Steam, Condensate and Domestic Water Piping Replacement - DFCM #04133810

1. Project Location: Weber State University - Ogden, Utah.

B. Owner: Weber State University

1. Owner's Representative: DFCM

C. Architect/Engineer: WHW Engineering

D. The Work consists of the following:

1. The Work includes replacing the steam, condensate and domestic water piping from the crawl space under the first floor to the ceiling of the first floor to serve the second floor.
2. This contractor shall connect to the existing steam, condensate, and domestic hot and cold water installed under phase one, first floor.
3. Drinking fountains on second floor shall be replaced.

1.4 USE OF PREMISES

A. General: Contractor shall have use of the interior space for construction operations. Work in the building shall be coordinated with the Owner. Work In the building is not

permitted unless permission is given. Work in the crawl space is not limited unless it shuts down the building.

1. Owner Occupancy: Allow for Owner occupancy of Project site and use by the public.
2. Entrances: Keep entrances serving premises clear and available to Owner, Owner's employees, and the public.

B. Use of Existing Building: Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

1.5 OWNER'S OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy: Owner will occupy site and building during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations. See paragraph 1.4 – B.

1.6 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, except otherwise indicated.

1. Weekend Hours: As approved by the Owner.
2. Early Morning Hours: As approved by the Owner.
3. Hours for Utility Shutdowns: 72 hours notice. See paragraph 1.5 – A – 2.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than 72 hours in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.

1.7 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
2. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

    a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

SECTION 01270 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for unit prices.

B. Related Sections include the following:

1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
2. Division 1 Section "Quality Requirements" for general testing and inspecting requirements.
3. Division 1500 Section “Pneumatic Controls" for procedures for measurement and payment for unit-price item #1.

1.3 DEFINITIONS

A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A list of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

A. Unit Price No. 1 - Replace existing pneumatic thermostats:

1. Description: Provide a unit price, per item, to replace existing pneumatic thermostats according to Division 15 Section "Pneumatic Controls."
2. Unit of Measurement: Per individual thermostat unit**.**
3. Description: Provide a unit price, per item, to replace each existing lay-in ceiling tile according to Division 15 Section 09511 “Acoustic Panel Ceilings.”
4. Unit of measurement: Per individual ceiling panel.

B. Unit Price No. 2 – Replace ceiling tile track and grid

1. Provide a unit price per square foot to replace ceiling tile, track, and grid as requested by owner at substantial completion. New ceiling system shall comply with specification section 09511.

END OF SECTION 01270

SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Preliminary Construction Schedule.
2. Contractor's Construction Schedule.
3. Submittals Schedule.
4. Daily construction reports.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
2. Predecessor activity is an activity that must be completed before a given activity can be started.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.

3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

G. Major Area: A story of construction, a separate building, or a similar significant construction element.

H. Milestone: A key or critical point in time for reference or measurement.

1.4 SUBMITTALS

A. Contractor's Construction Schedule: Submit FIVE printed copies of initial schedule, one a reproducible print and one a blue- or black-line print, large enough to show entire schedule for entire construction period.

B. Daily construction reports or logs: Submit at progress meetings.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

B. Time Frame: Extend schedule from date established for the Notice to proceed to date of Substantial Completion and Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

2. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work under More Than One Contract: Include a separate activity for each contract.
3. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
4. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Occupancy before Substantial Completion.
    e. Use of premises restrictions.
    f. Provisions for future construction.
    g. Seasonal variations.
    h. Environmental control.

5. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Subcontract awards.
    b. Submittals.
    c. Purchases.
    d. Fabrication.
    e. Deliveries.
    f. Installation.
    g. Tests and inspections.
    h. Adjusting.
    i. Curing.
    j. Startup and placement into final use and operation.

6. Area Separations: Identify each major area of construction or each major discipline of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

    a. Structural completion.
    b. Permanent space enclosure.
    c. Completion of mechanical installation.
    d. Completion of electrical installation.
    e. Substantial Completion.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, [Substantial Completion, and Final Completion.

F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

G. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

2.2 PRELIMINARY CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work.

2.3 REPORTS

A. Daily Construction Reports or Logs: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. High and low temperatures and general weather conditions.
5. Accidents.
6. Meetings and significant decisions.
7. Unusual events (refer to special reports).
8. Stoppages, delays, shortages, and losses.
9. Emergency procedures.
10. Orders and requests of authorities having jurisdiction.
11. Change Orders received and implemented.
12. Construction Change Directives received.
13. Services connected and disconnected.
14. Equipment or system tests and startups.
15. Partial Completions and occupancies.
16. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At bi-monthly intervals or at progress meetings, update schedule to reflect actual construction progress and activities. Issue schedule during each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Actual Completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

3.2 CONSTRUCTION PHOTOGRAPHS

A. Periodic Construction Photographs: Take photographs weekly, coinciding with cutoff date associated with each Application for Payment. Photographer shall select vantage

points to best show status of construction and progress since last photographs were taken.

END OF SECTION 01320

SECTION 01731 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching of existing floors, walls, ceilings, tiles, etc.

1.3 DEFINITIONS

A. Cutting: Removal of existing construction necessary to permit installation or removal of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be removed and replaced and those that will be temporarily out of service. Indicate how long service will be disrupted.
6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Engineer's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive the right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

1. Primary operational systems.
2. Fire-protection systems.
3. Control systems.
4. Communication systems.
5. Electrical wiring systems.

C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Noise- and vibration-control elements and systems.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1. Engage a recognized, experienced, and specialized firm for cutting and patching of exposed work listed below:

a. Concrete finishes.
b. Stonework and stone masonry.
c. Ornamental metal.
d. Matched-veneer woodwork.
e. Preformed metal panels.
f. Roofing.
g. Fire stopping.
h. Stucco and ornamental plaster.
i. Terrazzo.
j. Finished wood flooring.
k. Aggregate wall coating.
l. Wall covering.
m. Brick.
n. Gypsum board.
o. Tile

E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. Existing Materials: Use materials identical to existing materials when they were new. For exposed surfaces, use materials that visually match what the existing adjacent surfaces were originally to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations using methods least likely to damage elements retained or adjoining construction. Review proposed procedures with User and Engineer and comply with their written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete / Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
5. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

END OF SECTION 01731

SECTION 01732 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Demolition and removal of existing steam, condensate and domestic hot and cold water piping not removed by asbestos abatement contractors.
2. Existing thermostats if unusable. See section 01270.
3. Removal of areas in walls, ceilings, floors, etc. for the installation of new piping.

B. Related Sections include the following:

1. Division 1 Section "Summary" for use of premises and Owner-occupancy requirements.
2. Division 1 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
3. Division 1 Section "Construction Waste Management" for disposal of demolished materials.
4. Division 1 Section "Cutting and Patching" for cutting and patching procedures.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

1.5 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

1. Comply with requirements specified in Division 1 Section "Summary."

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Owner will remove hazardous materials under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

1. Comply with requirements for existing services/systems interruptions specified in Division 1 Section "Summary."

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished at the time of their removal.

3.3 PREPARATION

A. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to building and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 1.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Maintain adequate ventilation.
2. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
3. Dispose of demolished items and materials promptly.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be salvaged or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 01732

SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.

B. Related Sections include the following:

1. Division 1 Section "Closeout Procedures" for general closeout procedures.
2. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. All divisions of the specifications for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set of marked-up Record Prints.
2. Number of Copies: Submit Record Drawings as follows:

a. Final Submittal: Submit one set of marked-up Record Prints. Print each Drawing, whether or not changes and additional information were recorded.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of prints of the Contract Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an understandable drawing technique.
c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Revisions to routing of piping and conduits.
d. Actual equipment locations.
e. Changes made by Change Order or Construction Change Directive.
f. Changes made following Engineer's written orders.
g. Details not on the original Contract Drawings.
h. Field records for variable and concealed conditions.

3. Mark the Contract Drawings completely and accurately.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Engineer’s reference during normal working hours.

END OF SECTION 01781

SECTION 04810 - UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:
   1. Concrete masonry units, replacement and patching.
   2. Face brick, replacement and patching.
   3. Mortar and grout.
   4. Reinforcing steel.
   5. Miscellaneous masonry accessories.

1.3 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops the following net-area compressive strengths (f'm)=1,500 psi at 28 days. Determine compressive strength of masonry from net-area compressive strengths of masonry units and mortar types according to IBC Section 2103.7, and tested according to ASTM C270.

1.5 SUBMITTALS

A. Product Data: For each different masonry unit, accessory, and other manufactured product specified.

B. Samples for Verification: For the following:

   1. Full-size units for each different exposed masonry unit required, showing the exposed colors, textures, and dimensions to match existing construction.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1093 to conduct the testing indicated, as documented according to ASTM E 548.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

1. Protect Type I concrete masonry units from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver pre-blended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store pre-blended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. General: Provide shapes indicated and as follows:

1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
2. Provide square-edged units for outside corners, unless indicated as bullnose.

B. Concrete Masonry Units: ASTM C 90 and as follows:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi
2. Weight Classification: Lightweight
3. Provide Type I, moisture-controlled units.
4. Size (Width): Manufactured to the following dimensions: and as indicated on drawings

   a. 8 inches nominal; 7-5/8 inches actual.

   b. 10 inches nominal; 9-5/8 inches actual.

2.2 BRICK

A. General: Provide shapes indicated and as follows:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
5. Hard burned fire clay shall substantially match the existing campus standard brick for coloring and texture. Color of mortar must also match existing.

B. Face Brick: ASTM C 216, Grade (match existing), Type (match existing).

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.
2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.

3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
4. Size (Actual Dimensions): (match existing).

2.3 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of Portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.

D. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

E. Aggregate for Grout: ASTM C 404.

F. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.

G. Water: Potable.

H. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. Mortar Cement:

a. Magnolia Superbond Mortar Cement; Blue Circle Cement.
b. Lafarge Mortar Cement; Lafarge Corporation.

2.4 REINFORCING STEEL

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, Grade 60.

2.5 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene .

B. Preformed Control-Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

1. Styrene-Butadiene-Rubber Compound: ASTM D 2000, Designation M2AA-805.
2. PVC: ASTM D 2287, Type PVC-65406.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inchteel wire, hot-dip galvanized after fabrication.

1. Provide units with either two loops or four loops as needed for number of bars indicated.

2.6 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Available Products: Subject to compliance with requirements, products that may be used to clean unit masonry surfaces include, but are not limited to, the following:

a. Cleaners for Red and Light-Colored Brick Not Subject to Metallic Staining with Mortar Not Subject to Bleaching:

1) 202 New Masonry Detergent; Diedrich Technologies, Inc.
2) Sure Klean No. 600 Detergent; ProSoCo, Inc.

2.7 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators,

B. retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
1. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, to ensure that mortar color is consistent.

C. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

D. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification.

1. Extended-Life Mortar for Unit Masonry: Mortar complying with ASTM C 1142 may be used instead of mortar specified above, at Contractor's option.
2. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
3. For reinforced masonry and where indicated, use Type S.
4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
5. For interior non-load-bearing partitions, Type O may be used instead of Type N.

E. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with IBC Table 2103.10 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

2.8 2.18 SOURCE QUALITY CONTROL

A. Owner will engage a qualified independent testing agency to perform source quality-control testing indicated below:

1. Payment for these services will be made by Owner.
2. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.

B. B. Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C 140.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
1. Verify that reinforcing dowels are properly placed.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this Section and in other Sections of the Specifications.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.

D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.3 CONSTRUCTION TOLERANCES

A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:

B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.

C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, nor 1/2 inch maximum.

D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.

E. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

F. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

1. As indicated on Drawings.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.

F. Fill space between hollow-metal frames and masonry solidly with mortar, unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow masonry units as follows:

1. With full mortar coverage on horizontal and vertical face shells.
2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.

C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.6 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.

1. Construct formwork to conform to shape, line, and dimensions shown. Make it sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements of the 2000 International Building Code.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.

1. Comply with requirements of the International Building Code for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.7 FIELD QUALITY CONTROL

A. Owner will engage a qualified independent testing agency to perform field quality-control testing indicated below.

1. Payment for these services will be made by Owner.
2. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.

B. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction for each 5000 sq. ft. of wall area or portion thereof.

C. Mortar properties will be tested per ASTM C 780.

D. Grout will be sampled and tested for compressive strength per ASTM C 1019.

E. Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C 140.

F. Prism-Test Method: For each type of wall construction indicated, masonry prisms will be tested per ASTM C 1314 and as follows:

1. Prepare 1 set of prisms for testing at 7 days and 1 set for testing at 28 days.

3.8 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
5. Clean brick by the bucket-and-brush hand-cleaning method described in BIA Technical Notes No. 20, using job-mixed detergent solution.
6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.
8. Clean limestone units to comply with recommendations in the Indiana Limestone Institute of America's "Indiana Limestone Handbook."

3.9 MASONRY WASTE DISPOSAL

A. Recycling: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

END OF SECTION 04810

SECTION 09260 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Patching or replacing interior gypsum wallboard.
2. Non-load-bearing steel framing.

1.3 DEFINITIONS

A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

B. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Steel Framing and Furring:

    a. Clark Steel Framing Systems.
    b. Consolidated Systems, Inc.
    c. Dale Industries, Inc. - Dale/Incor.
    d. National Gypsum Company.
    e. Scafco Corporation.
    f. Unimast, Inc.
    g. Western Metal Lath & Steel Framing Systems.

2. Gypsum Board and Related Products:

    a. American Gypsum Co.
    b. G-P Gypsum Corp.
    c. National Gypsum Company.
    d. United States Gypsum Co.

2.2 STEEL SUSPENDED CEILING AND SOFFIT FRAMING

A. Components, General: Comply with ASTM C 754 for conditions indicated.

B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch- diameter wire.

C. Hanger Attachments to Concrete: As follows:

1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching hanger wires and capable of sustaining, without failure, a load equal to **5** times that imposed by construction as determined by testing according to ASTM E 488 by a qualified independent testing agency.

D. Hangers: As follows:

1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.
2. Rod Hangers: ASTM A 510, mild carbon steel.

3. Flat Hangers: Commercial-steel sheet, ASTM A 653/A 653M, G40, hot-dip galvanized.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch, a minimum 1/2-inch- wide flange, with ASTM A 653/A 653M, G40, hot-dip galvanized zinc coating.

F. Furring Channels (Furring Members): Commercial-steel sheet with ASTM A 653/A 653M, G40, hot-dip galvanized zinc coating.

1. Cold Rolled Channels: 0.0538-inch bare steel thickness, with minimum 1/2-inch-wide flange, 3/4 inch deep.
2. Steel Studs: ASTM C 645.

a. Minimum Base Metal Thickness: As indicated.
b. Depth: As indicated

3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.

a. Minimum Base Metal Thickness: 0.0179 inch.

2.3 INTERIOR GYPSUM WALLBOARD

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Gypsum Wallboard: ASTM C 36.

1. Type X:

a. Thickness: 5/8 inch.
b. Long Edges: Tapered.

C. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M.

1. Available Product: Subject to compliance with requirements, a product that may be incorporated into the Work includes, but is not limited to, "Dens-Glass Gold" by G-P Gypsum Corp.
2. Core: Manufacturer’s standard.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
2. Shapes:

    a. Cornerbead: Use at outside corners.
    b. LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges.
    c. U-Bead: J-shaped; exposed short flange does not receive joint compound; use at exposed panel edges.
    d. Expansion (Control) Joint: Use where indicated.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Fry Reglet Corp.
    b. Gordon, Inc.
    c. MM Systems Corporation.
    d. Pittcon Industries.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.
2. Glass-Mat Gypsum Sheathing Board, where required: 10-by-10 glass mesh.
3. Tile Backing Panels, where required: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Isolation Strip at Exterior Walls:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

E. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

F. Thermal Insulation: As specified in Division 7 Section "Building Insulation."

G. Polyethylene Vapor Retarder: As specified in Division 7 Section "Building Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Ceilings: Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers at spacing required to support ceilings and that hangers will develop their full strength.

1. Furnish concrete inserts and other devises indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLING STEEL FRAMING, GENERAL

A. Installation Standards: ASTM C 754, and ASTM C 840 requirements that apply to framing installation.

B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."

C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement.

1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.

    a. Use deep-leg deflection track where indicated.
    b. Use proprietary deflection track where indicated.
    c. Use proprietary firestop track where indicated.

D. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

3.4 INSTALLING STEEL SUSPENDED CEILING AND SOFFIT FRAMING

A. Suspend ceiling hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
4. Secure hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.

5. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
6. Do not attach hangers to steel deck tabs.
7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet measured lengthwise on each member and transversely between parallel members.

C. Sway-brace suspended steel framing with hangers used for support.

D. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards.

E. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

A. Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction.

1. Where studs are installed directly against exterior walls, install asphalt-felt or foam-gasket isolation strip between studs and wall.

B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch from the plane formed by the faces of adjacent framing.

C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

1. Cut studs 1/2 inch short of full height to provide perimeter relief. Do not fasten studs to top track to allow independent movement of studs and track.
2. For fire-resistance-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.

    a. Terminate partition framing at suspended ceilings where indicated.

D. Install steel studs and furring at the following spacings:

1. Single-Layer Construction: 16 inches o.c., unless otherwise indicated.
2. Cementitious Backer Units: 16 inches o.c., unless otherwise indicated.

E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.

F. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

1. Install two studs at each jamb, unless otherwise indicated.
2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint.
3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.

G. Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

H. Z-Furring Members:

1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
4. Until gypsum board is installed, hold insulation in place with 10-inch staples fabricated from 0.0625-inch- diameter, tie wire and inserted through slot in web of member.

3.6 APPLYING AND FINISHING PANELS, GENERAL

A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.

B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

D. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints.

Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

G. Attach gypsum panels to framing provided at openings and cutouts.

H. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members using resilient channels, or provide control joints to counteract wood shrinkage.

I. Form control and expansion joints with space between edges of adjoining gypsum panels.

J. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

K. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

L. Floating Construction: Where feasible, including where recommended in writing by manufacturer, install gypsum panels over wood framing, with floating internal corner construction.

M. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

N. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.

1. Space screws a maximum of 12 inches o.c. for vertical applications.

O. Space fasteners in panels that are tile substrates a maximum of 8 inches o.c.

3.7 PANEL APPLICATION METHODS

A. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of board.
    b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

B. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.8 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

3.9 FINISHING GYPSUM BOARD ASSEMBLIES

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:

1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated.
2. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.

3.10 FIELD QUALITY CONTROL

A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, Architect will conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.

END OF SECTION 09260

SECTION 09511 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Ceilings consisting of acoustical panels and concealed suspension systems.
2. Removing, repairing and replacing existing acoustical panels and concealed suspension systems.
3. Removing and stockpiling of existing ceiling panels to be re-used as replacement panels in areas of existing suspended ceiling disturbance.

1.3 SUBMITTALS

A. Product Data: For each type of product specified.

B. Samples for Verification: Full-size units of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics, and as required to match existing acoustical panels.

1. Set of 12-inch- long samples of concealed suspension system members.
2. Set of 12-inch- long samples of exposed moldings for each color and system type required.

C. Product Test Reports: Indicate compliance of acoustical panel ceilings and components with requirements based on comprehensive testing of current products.

D. Research/Evaluation Reports: Evidence of acoustical panel ceiling's and components' compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Source Limitations for Ceiling Units: Obtain each acoustical ceiling panels from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Source Limitations for Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1. Obtain both acoustical ceiling panels and suspension system from the same manufacturer.

D. Fire-Test-Response Characteristics: Provide acoustical tile ceilings that comply with the following requirements:

1. Fire-response tests were performed by UL, ITS/Warnock Hersey, or another independent testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
2. Surface-burning characteristics of acoustical tiles comply with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84.
3. Fire-resistance-rated assemblies, which are indicated by design designations from UL's "Fire Resistance Directory," from ITS/Warnock Hersey's "Directory of Listed Products," or from listings of another testing and inspecting agency, are identical in materials and construction to those tested per ASTM E 119.
4. Products are identified with appropriate markings of applicable testing and inspecting agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

B. Coordinate areas of existing suspended ceiling disturbance with required piping replacement and HVAC work.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size units equal to 5.0 percent of amount of new ceiling panels installed.
2. Suspension System Components: Quantity of each grid and exposed component equal to 2.0 percent of amount of new suspension system components installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to:

1. Armstrong World Industries, Inc.
2. Celotex Corporation (The); Building Products Division; Architectural Ceilings Marketing Dept.
3. USG Interiors, Inc.
4. Match existing acoustical ceiling panels and suspension systems as noted.

2.2 ACOUSTICAL PANELS, GENERAL

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

1. Mounting Method for Measuring Noise Reduction Coefficient: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E 795.

B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type, and as required to match existing. New acoustical ceiling panels are to match existing panels in Main Floor (Upper Level) Hallway.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.

B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated. New acoustical ceiling suspension systems are to match existing suspension systems in Main Floor (Upper Level) Hallway.

C. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.

D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.

E. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

F. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

G. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.

H. Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical tile edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.

1. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

I. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's product designations, including splice plates, corner pieces, and attachment and other clips, complying with the following requirements:

1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221/B 221M for alloy and temper 6063-T5.
2. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong World Industries, Inc.

b. Celotex Corporation (The); Building Products Division; Architectural Ceilings Marketing Dept.
c. Chicago Metallic Corporation.
d. Fry Reglet Corporation.
e. Gordon, Inc.
f. MM Systems, Inc.
g. USG Interiors, Inc.
h. As required to match existing.

2.4 ACOUSTICAL SEALANT

A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following requirements:

1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

C. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. Acoustical Sealant for Exposed and Concealed Joints:

a. PL Acoustical Sealant; ChemRex, Inc., Contech Brands.
b. AC-20 FTR Acoustical and Insulation Sealant; Pecora Corp.
c. SHEETROCK Acoustical Sealant; United States Gypsum Co.

2. Acoustical Sealant for Concealed Joints:

a. BA-98; Pecora Corp.
b. Tremco Acoustical Sealant; Tremco, Inc.

2.5 MISCELLANEOUS MATERIALS

A. Tile Adhesive: Type as recommended by tile manufacturer, bearing UL label for Class 0-25 flame spread.

B. Staples: 5/16-inch- long, divergent-point staples.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and structural framing to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical tile ceilings.

1. Proceed with installation only after unsatisfactory conditions have been corrected.
2. Coordinate with other trades for required areas of existing ceiling disturbance to complete piping replacement work.
3. Remove and stockpile existing acoustical ceiling panels for use as replacement panels in areas of suspended ceiling system disturbance, where indicated and elsewhere as required. Refer to drawings for areas replacement panels are to be taken from. Furnish and install new acoustical ceiling panels for areas where existing panels are removed for use as replacement panels.

3.2 PREPARATION

A. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other Sections.

1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordinating other work.

B. Testing Substrates: Before installing adhesively applied tiles on wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.

C. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width units at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install acoustical tile ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
2. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
3. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings--Seismic Zones 0-2."
4. CISCA's Guidelines for Systems Requiring Seismic Restraint: Comply with CISCA's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies--Seismic Zones 3 & 4."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
6. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
7. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, powder-actuated fasteners, or drilled-in anchors that extend through forms into concrete.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches from ends of each member.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical units.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels in coordination with suspension system and exposed moldings and trim. Place splines or suspension system flanges into kerfed edges so panel-to-panel joints are closed by double lap of material.

1. Fit adjoining panel to form flush, tight joints. Scribe and cut tile for accurate fit at borders and around penetrations through tile.
2. Hold panel field in compression by inserting leaf-type, spring-steel spacers between panels and moldings, spaced 12 inches o.c.
3. Fabricate access units for special suspension system access members and panel units modified as required to allow for removal of access units.
4. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace panels and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

B. Clean existing exposed surfaces of suspension system members as required prior to installation of replacement ceiling panels.

3.5 UNIT COSTS

A. Unit costs #1: Provide a unit cost for replacement of existing ceiling panels if it is determined that the existing ceiling panel is broken, discolored, etc. and cannot be reused. Provide a cost per ceiling panel including panel and labor.

END OF SECTION 09511

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes surface preparation and field painting of the following:

1. Exposed interior items and surfaces, including new exposed HVAC and Electrical equipment, including requirements of Section 15051 – 1.13.
2. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment and any surface damaged by demolition and new installation i.e. walls.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include the following factory-finished components:

a. Architectural woodwork and casework.
b. Acoustical wall panels.
c. Pre-finished aluminum piping jackets.

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

a. Foundation spaces.
b. Furred areas.
c. Ceiling plenums.
d. Pipe spaces.

3. Finished metal surfaces include the following:

a. Anodized aluminum.
b. Stainless steel.
c. Chromium plate.
d. Copper.
e. Bronze and brass.

4. Operating parts include moving parts of operating equipment and the following:

a. Valve and damper operators.
b. Linkages.
c. Sensing devices.
d. Motor and fan shafts.

5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Related Sections include the following:

1. Division 8 Section "Steel Doors and Frames" for shop priming steel doors and frames.
2. Division 9 Section "Gypsum Board Assemblies" for surface preparation for gypsum board.

1.3 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.4 SUBMITTALS

A. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated.

B. Samples for Verification: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Re-submit until required sheen, color, and texture are achieved.
2. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.
3. Color samples are to be approved by the Project Manager before issued to the Contractor.
4. Piping, walls, ceilings and floors in Mechanical Rooms are to be painted light durable colors. Use National Standard color coding for pipes required to be painted above suspended ceilings.
5. A standard paint color scheme for most interior walls has been selected by the Facilities Management Department. The contractor shall coordinate with the Owner's Project Manager prior to purchasing any paint.

C. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work ar-

eas are protected from fire and health hazards resulting from handling, mixing, and application.

1.7 PROJECT CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F.

C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.8 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to the Owner.

1. Quantity: Furnish the Owner with an additional 5 percent, but not less than 1 gal. or 1 case, as appropriate, of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in the paint schedules.

B. Manufacturers Names: The following manufacturers are referred to in the paint schedules by use of shortened versions of their names, which are shown in parentheses:

1. Benjamin Moore & Co. (Moore).
2. Pratt & Lambert, Inc. (P & L).
3. Sherwin-Williams Co. (S-W).

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

C. Colors: Provide color selections made by the Owner’s Project Manager and Engineer/Architect.

2.3 CONCRETE UNIT MASONRY BLOCK FILLERS

A. Concrete Unit Masonry Block Filler: Factory-formulated high-performance latex block fillers.

1. Benjamin Moore; Moorcraft Super Craft Latex Block Filler No. 285: Applied at a dry film thickness of not less than 8.1 mils.
2. Pittsburgh Paints; 6-7 SpeedHide Interior/Exterior Masonry Latex Block Filler: Applied at a dry film thickness of not less than 6.0 to 12.5 mils.
3. Sherwin-Williams; PrepRite Interior/Exterior Block Filler B25W25: Applied at a dry film thickness of not less than 8.0 mils.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.
2. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

    a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
    b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.

3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.

    a. Blast steel surfaces clean as recommended by paint system manufacturer and according to requirements of SSPC-SP 10.
    b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
    c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.

D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are to be according to University standards selected by the Facilities Management Department, and as required to match existing painted walls indicated in the schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
9. Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer on metal surfaces that have been shop primed and touchup painted.

3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.

F. Mechanical items to be painted include, but are not limited to, the following:

1. Pipe hangers, and supports.
2. Accessory items.
3. Equipment, and insulation having "all-service jacket" or other paintable jacket material.
4. Mechanical equipment that is indicated to have a factory-primed finish for field painting.

G. Electrical items to be painted include, but are not limited to, the following:

1. Exposed conduit and fittings.

H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

I. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudi-

ness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

K. Two finish coats are required over a primer coat on all painted surfaces unless approved otherwise in writing.

L. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.5 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.6 INTERIOR PAINT SCHEDULE

A. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces, as required to match existing painted finishes:

1. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a primer.

a. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.

1) Moore: Regal First Coat Interior Latex Primer & Underbody #216.
2) P & L: Z/F 1001 Suprime "1" 100 Percent Acrylic Multi-Purpose Primer.

b. First and Second Coats: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.

1) Moore: Moore's Regal AquaGlo Vinyl-Acrylic Latex Enamel #333.
2) P & L: Z/F 4100 Series Accolade Interior Semi-Gloss.

2. Flat Acrylic Finish: Two finish coats over a primer.

a. Primer: Interior gypsum board primer.
b. Finish Coats: Interior flat acrylic paint.

3. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.

a. Primer: Interior gypsum board primer.
b. Finish Coats: Interior low-luster acrylic enamel.

B. Concrete Unit Masonry: Provide the following finish systems over interior concrete masonry, as required to match existing painted finishes:

1. Flat Acrylic Finish: Two finish coats over a block filler.

a. Block Filler: Concrete unit masonry block filler.
b. Finish Coats: Interior flat acrylic paint.

2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a block filler.

a. Block Filler: Concrete unit masonry block filler.
b. Finish Coats: Interior low-luster acrylic enamel.

3. Semigloss Acrylic-Enamel Finish: Two finish coats over a block filler.

a. Block Filler: Concrete unit masonry block filler.
b. Finish Coats: Interior semigloss acrylic enamel.

4. Semigloss Alkyd-Enamel Finish: Two finish coats over a filled surface.

a. Block Filler: Concrete unit masonry block filler.
b. Finish Coat: Interior semigloss alkyd enamel.

C. Ferrous Metal: Provide the following finish systems over ferrous metal as required to match existing painted finishes:

1. Low-Luster, Acrylic-Enamel Finish: 2 finish coats over a primer.

a. Primer: Quick-drying, rust-inhibitive, alkyd-based or epoxy-metal primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils.

1) Moore: IronClad Retardo Rust-Inhibitive Paint #163.
2) P & L: S 4551 Tech-Gard High Performance Rust Inhibitor Primer.

b. First and Second Coats: Low-luster (eggshell or satin), acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils.

1) Moore: Moore's Regal AquaVelvet #319.
2) P & L: Z/F 4000 Series Accolade Interior Velvet.

D. Interior Zinc-Coated Metal Primer as required to match existing painted finishes: Factory-formulated galvanized metal primer.

1. Benjamin Moore; Moore's IMC Acrylic Metal Primer No. M04: Applied at a dry film thickness of not less than 2.0 mils.
2. Pittsburgh Paints; 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils.
3. Sherwin-Williams; Galvite HS B50WZ30: Applied at a dry film thickness of not less than 3.0 mils.

E. Zinc-Coated Metal: Provide the following finish systems over interior zinc-coated metal surfaces as required to match existing painted finishes:

1. Low-Luster Acrylic-Enamel Finish: Two finish coats over a galvanized metal primer.

F. All-Service Jacket over Insulation: Provide the following finish system on cotton or canvas insulation covering as required to match existing painted finishes:

1. Flat Acrylic Finish: Two finish coats. Add fungicidal agent to render fabric mildew proof.

a. Finish Coats: Interior flat latex-emulsion size.

END OF SECTION 09900

DIVISION 15
MECHANICAL SPECIFICATION

SECTION 15010 - GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL:

A. General Conditions and Division 01 apply to this Division.

1.2 SCOPE:

A. Includes -

1. Furnish all labor, materials, and equipment necessary for completion of the mechanical work for the Weber State University Buildings # 4 - 2nd Floor Steam, Condensate, and Domestic Water Piping Replacement.
2. Placing the new piping systems into full operation and continuing their operation during each working day of testing.
3. The satisfactory performance of the completed systems is a requirement of this specification.

1.3 SITE INSPECTION:

A. The Contractor shall examine the Building # 4 site and understand the conditions which may affect the performance of work of this Division before submitting proposals for this work.

B. No subsequent allowance for time or money will be considered for any consequence related to failure to examine existing site conditions.

1.4 DRAWINGS:

A. Mechanical drawings show general arrangement of piping, equipment, etc; however, locations are to be regarded as shown diagrammatically only. Follow as closely as actual building construction and work of other trades will permit.

B. Because of the small scale of mechanical drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate existing structural and finished conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

C. If changes in location of piping, equipment, etc. are required due to lack of coordination of work under this division, such changes shall be made without charge.

1.5 CODE REQUIREMENTS, FEES, AND PERMITS:

A. The work shall be installed in accordance with the following applicable codes, ordinances and standards unless otherwise specified. The codes and standards shall include but not be limited to and be of the latest and current editions.

1. American National Standards Institute (ANSI)
2. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
3. American Society of Mechanical Engineers (ASME)
4. American Society of Testing Materials (ASTM)
5. American Standards Association (ASA)
6. American Welding Society (AWS)
7. Associated Air Balance Council (AABC)
8. National Electrical Code (NEC)
9. National Fire Protection Association (NFPA)
10. Underwriters Laboratories (UL)
11. International Building Code (IBC) 2003 ed
12. International Mechanical Code (IMC) 2003 ed
13. International Plumbing Code (IPC) with Utah Amendments 2003 ed
14. Utah State Safety Orders (OSHA/UOSH)
15. Utah Fire Rating Bureau
16. Utah Boiler and Pressure Vessel Law
17. Utah Air Conservation Regulations/Waste Disposal regulations.
18. Energy Code for Commercial and High Rise Building ASHRAE/IES NA 90.1-2001.

B. Should drawings conflict with any code, the code shall govern. If drawings and specifications establish a quality exceeding the code, the drawings and specifications shall govern. If conflicts do exist among the drawings, specifications and codes, the same shall be brought to the attention of the Engineerin writing prior to bidding; otherwise Contractor shall comply with applicable codes.

C. The latest edition of all codes shall be used.

D. Contractor shall give all notices and obtain approvals for completion of the mechanical and plumbing work outlined in this Division of the specifications and shown on the Drawings.

1.6 OPERATION AND MAINTENANCE MANUAL FOR MECHANICAL SYSTEMS:

A. Upon completion of work and before substantial completion, Contractor shall furnish and deliver to the Owner, through the Engineer, four (4) printed sets and one electronic copy of installation, operating and maintenance manuals and instructions for all new materials and mechanical equipment used in the building. Electronic copy shall be organized with the same tabs and sections as the hardcopy. Where O & M Manuals are not delivered at substantial completion, the General Contractor will assume 100% responsibility for all maintenance until the manuals are delivered to the project manager’s satisfaction.

B. Bind Operation and Maintenance Manual for Mechanical Systems in a hard-backed piano hinge loose-leaf binder with strong sturdy cover. The following lettering shall be stamped on front and spine of each binder:

OPERATION
AND
MAINTENANCE
MANUAL
for MECHANICAL SYSTEMS of
Building 4 - 2nd Floor
Steam, Condensate, and Domestic Water Piping Replacement
Weber State University, Ogden, Utah
WHW Engineering Inc.

C. The first section is to contain the following information.

1. First page shall be a table of contents including name of project, date awarded and date of substantial completion.
2. Second page shall contain the names, phone numbers and addresses of Architect, Consulting Engineers, and Associates.
3. Third page shall contain a list of names, addresses and phone numbers of contractors and all sub-contractors and work to which each was assigned.
4. Final page or pages shall contain an equipment list. The list shall contain each item of equipment or material for which a submittal was required giving ID or tag no as contained on the drawings make and model No. Serial No. Identification No. Location in building, function and name address and phone number of supplier.

D. The second section shall contain

1. Description of each operating system including location of switches, breakers, thermostats, control devices. Provide a single line diagram, showing set points, normal operating parameters for all loads, pressures, temperatures and flow check points; Describe all alarms and cautions for operation.
2. Provide schematic control diagrams, panel diagrams, wiring diagrams etc (blue line prints) for each separate system, each control diagram shall show a schematic representation of mechanical equipment and location of start-stop switches, insertion thermostats, thermometers, pressure gauges, automatic valves etc. The correct reading for each control instrument shall be marked on the diagram.

E. The third section shall contain a comprehensive lubrication list and maintenance schedule for equipment with moving parts. If bearings are sealed equipment shall still be included and a statement to indicate no lubrication or maintenance required.

F. The fourth section shall contain data on plumbing fixtures, piping, equipment, accessories, and specialties.

1. Section shall contain general product catalog cuts, approved submittal sheets and exploded view drawings with parts lists for all valves and other items with multiple parts.

G. The final sections shall be one for each individual item for which a submittal sheet was required. Each section shall include:

1. Equipment descriptions
2. Detailed installation instruction, operating and maintenance instructions (provided more than just product operations and maintenance instructions provided with unit where required. Instructions should be written in a step by step manner identifying start-up, operating, shutdown and emergency action sequence sufficiently clear so a person unfamiliar with the equipment could perform its operations.
3. Equipment drawings, performance curves, operating characteristics, etc.
4. Name addresses and phone number of manufacturer, fabricator and local vender clearly printed or stamped on cover.
5. Complete parts listing which include catalog number, serial number, contract number or other accurate provision for ordering replacement and spare parts.
6. Certified drawings, where applicable, showing assembly of parts and general dimensions.
7. General product and approved submittal sheets.

H. Drawings and reproducible masters of drawings as required in individual specification sections are not to be bound in volumes but are to be delivered separate with the maintenance manuals.

I. Equipment to be covered:

1. Mechanical equipment
2. Plumbing fixtures, piping, equipment, accessories and specialties.
3. Automatic controls and sensing systems
4. Any item for which a submittal is required.

J. Contractor, if approved by WSU, could use the existing O&M Manuals provided during the renovation of buildings 3 and 4. Contractor could add any new information to these manuals.

1.7 OPERATION AND MAINTENANCE INSTRUCTIONS:

A. Contractor shall instruct building maintenance personnel in the operation and maintenance of the installed mechanical systems utilizing the Operation and Maintenance Manual when so doing.

B. Minimum instruction periods shall be as follows:

1. Total Mechanical, Plumbing and Control - Two hours.

C. Instruction periods shall occur before final inspection when systems are properly working and before final payment is made.

1.8 RECORD DRAWINGS:

A. Contractor shall keep an up-to-date set of mechanical and plumbing drawings in his custody showing all changes in red, clearly defined and neatly drafted by him. At the end of construction, he shall turn these drawings over to the Engineer. Record drawings must be completed and submitted prior to final inspection.

PART 2 - PRODUCTS
(Not Used)

PART 3 - EXECUTION
(Not Used)

END OF SECTION 15010

SECTION 15051 - BASIC MATERIALS & METHODS GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL:

A. Division 15010 General applies to this Section.

1.2 COORDINATION OF WORK:

A. It is understood that while Drawings are to be followed as closely as circumstances permit, this Division will be held responsible for the installation of systems according to the true intent and meaning of the Contract Documents. Anything not clear or in conflict will be explained by making application to the Engineer in writing. Should conditions arise where certain changes would be advisable, secure Owner's and Engineer approval for these changes before proceeding with work.

B. Coordinate work of various trades in installing interrelated work. Before installation of mechanical items, make proper provision to avoid existing interferences. Changes required in work specified in Division 15 caused by neglect to secure approval shall be made at no cost to Owner.

C. Arrange piping and equipment to permit ready access to valves, unions, starters, motors, control components, and to clear openings of doors and access panels.

D. Furnish and install supports required by Division 15 unless otherwise noted.

E. Be responsible for required cutting, and patching incident to work of this Division and make required repairs afterwards to satisfaction of Owner and Engineer. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.

1. Patch and repair walls, floors and roofs with materials of same quality as adjacent surfaces unless otherwise shown. Surface finishes shall match the original intent of the existing finishes of same materials.
2. This Division shall bear expense of cutting, patching, repairing, and replacing of work of other Divisions because of its fault, error, tardiness, or because of damage done by it.

F. Adjust locations of piping, equipment, etc, to accommodate work from interferences anticipated and encountered. Determine exact route and location of each pipe and cut prior to fabrication.

1. Make offsets, transitions, and changes in direction of piping and electrical raceways as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.

G. Slots and openings through floors, walls and roofs shall be provided by this Division. Use existing openings where possible.

H. This Contractor shall schedule his work, store his equipment and materials, and work in harmony with other Contractors so as to not delay or jeopardize the construction.

I. This Division shall coordinate with electrical contractor to insure that all required components of control work are included and fully understood. Any discrepancies shall be called to the attention of the Engineer before completion of bids. No additional cost shall accrue to the Owner as a result of lack of such coordination.

1.3 EQUIPMENT & MATERIALS:

A. Requests for substitution shall be received in writing a minimum of seven days prior to bidding. Prior acceptance shall be by Manufacturer's name only. Items not listed in this specification or subsequent addendums shall not be considered. No oral approvals will be acceptable. Manufacturers listed in this specification are acceptable only for items listed. All other items manufacturer wishes to bid must be prior approved. All equipment shall be subject to final review in accordance with "Project Submittals".

B. Product Approvals -

1. If approval is received to use other than specified items, responsibility for specified capacities and insuring that items to be furnished will fit space available lies with this Division.
2. In the event other than specified equipment is used and will not fit job site conditions, this Division assumes responsibility for replacement with items named in Specification.

C. Use domestic made pipe, pipe fittings, and motors on Project.

D. Motor and equipment name plates as well as applicable UL labels shall be in place when Project is turned over to Owner.

E. Insure that items to be furnished fit spaces available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. Do not scale off drawings.

F. All materials shall be of the best commercial quality obtainable, consistent with specified materials and for the purpose or function intended. Materials shall be new unless specifically excepted.

G. Equipment catalog or model numbers shown define the basic equipment types and quality standard only. Catalog numbers shall not be considered as all inclusive and shall be verified to include all devices, controls, operators, and appurtenances necessary for the satisfactory and complete operation of the equipment.

H. Follow manufacturer's directions in delivery, storage, protection, and installation of equipment and materials.

1. Promptly notify Engineer in writing of conflicts between requirements of Contract Documents and Manufacturer's directions and obtain Engineer's written instructions before proceeding with work. Contractor shall bear all expenses arising from correcting deficiencies of work that does not comply with Manufacturer's directions or such written instructions from Engineer.

I. Deliver equipment and material to site and tightly cover and protect against dirt, water, and chemical or mechanical injury but have readily accessible for inspection. Store items subject to moisture damage (such as controls) in a dry, heated space.

1.4 PROJECT SUBMITTALS:

A. Furnish complete catalog data for manufactured items of equipment to be used in the Work to Engineer for review within 7 days after award of Contract.

B. Submittal shall include, but not be limited to the following:

1. equipment scheduled
2. insulation
3. temperature controls
4. certificates of guarantee
5. valves
6. plumbing fixtures, piping, accessories, and specialties
7. any item for which more than one manufacturer is mentioned

C. Submit a minimum of five copies of data in binders and index in same order and name as they appear in Specification.

1. State sizes, capacities, brand names, motor HP, electrical requirements, accessories, materials, gauges, dimensions, and other pertinent information.
2. List on catalog covers page numbers of submitted items.
3. Underline or highlight applicable data.

D. If material or equipment is not as specified or submittal is not complete, it will be rejected.

E. Catalog data or shop drawings for equipment which are noted as being reviewed by Engineer shall not supercede Contract Documents.

F. Review comments of Engineer shall not relieve this Division from responsibility for deviations from Contract Documents unless Engineer's attention has been called to such deviations in writing at time of submission, nor shall they relieve this Division from responsibility for errors in items submitted.

G. Check work described by catalog data with Contract Documents for deviations and errors.

H. All items other than first named specified equipment shall show and state all exceptions and deviations taken and shall include design calculations and drawing layouts.

I. The Contractor shall review the submittals prior to submission to the Engineer to make sure that the submittals are complete in all details. No submittal will be reviewed which does not bear the contractor's notation that such checking has been made.

J. No partial submittals will be considered unless approved by the Engineer.

K. Manufacturers' names shall be mentioned as acceptable prior to bidding.

L. Contractor shall verify equipment dimensions to fit the spaces provided with sufficient clearance for servicing the equipment.

M. Contractor shall review equipment submittals for compliance with schedules, specifications, and drawing plans and details. Equipment submittal shall show the proper arrangements to suit installation and maintenance.

N. Equipment submittal sheets shall be clearly marked indicating equipment symbol and exact selection of proposed equipment. Submittals shall clearly indicate name of manufacturer of each item.

O. For unacceptable items, the right shall be reserved to require the first named specified items.

P. Where submittals are sent to Engineer with any of the above listed information missing or are incomplete they will be returned to the contractor unchecked to be completed and resubmitted. No additional time or money shall be allowed for failure to provide complete submittals on the first review.

Q. If an item requiring submittal review is ordered, purchased, shipped, or installed prior to the submittal review and is subsequently disapproved the item shall be removed from the job site and replaced with an approved item at contractors expense.

1.5 CLEANING & FINISHING:

A. Contractor shall, at all times, keep the premises free from waste material and rubbish. Upon completion of this Section of the work, Contractor shall remove all surplus materials and rubbish; clean all spots resulting from the mechanical work from hardware, floors, glass, walls, etc.; do all required patching up and repair all work of other trades damaged by Contractor under this Section of the work, and leave the premises in a clean orderly condition. Remove rust, plaster, dirt, grease and oil before painting, insulating, or exposing to view the equipment, piping, etc. in completed structure. Refinish any damaged surfaces and leave in proper working order at final completion.

1.6 EQUIPMENT SERVICING:

A. Prior to starting mechanical equipment, all motors, bearings and moving parts shall be properly oiled, greased and lubricated as required. Full and adequate maintenance service shall be given and upon completion all equipment shall be cleaned and checked and placed in perfect condition for the Owner.

1.7 SUPERVISION:

A. The Contractor shall supervise and direct the work with his best skill and attention. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor will be responsible to see that the finished work complies accurately with the Contract Documents.

1.8 SAFETY REGULATIONS:

A. Contractor shall provide equipment, supervision, construction, procedures, and everything necessary to assure safety of life or property.

B. Refer also to General Condition and Special Conditions for protection clauses.

1.9 LEAK DAMAGE:

A. Contractor shall be responsible for damages to the work of other Contractors or to the building, or to its contents, people, etc., caused by leaks in any of the equipment or piping installed by him through equipment or material failures, leaking joints or disconnected pipes, fittings, or by overflows and shall make at his own expense all repairs to fixtures, building interior, contents, paint, rugs, furniture, ceiling tile, and equipment so damaged.

1.10 TOOLS AND STORAGE OF EQUIPMENT:

A. The Contractor shall furnish all necessary tools, staging and whatever may be necessary for the installation of this work and shall at all times protect this work and others, and the materials to be used therein from damage by the weather, accident and other causes, and shall repair and make good any damage thus occurring.

1.11 WORKMANSHIP:

A. Workmanship shall be the best quality of its kind for respective industries, trades, crafts and practices and shall be acceptable in every respect to the Owner and Engineer. Nothing contained herein shall relieve the Contractor from performing good work, perfect in all details of construction.

1.12 TEMPORARY FACILITIES:

A. Furnishing of temporary water, space heating, sanitary facilities, drainage lines, light and power will be as specified in Division 01 General Conditions. All expenses involved shall be paid by the Contractor as described in General and Special Conditions.

1.13 PAINTING BY CONTRACTOR:

A. See section 09900 for painting requirements.

B. Painting shall be by persons experienced in painting.

C. All equipment, metal stands and supports shall be painted as follows:

1. The prime coat on equipment shall be factory applied. The finish coats shall be applied under Section 09900 of these specifications.
2. All equipment which is to be furnished in finished painted condition by Contractor shall be left without mark, scratch or impairment to finish upon completion and acceptance of job. Any necessary refinishing to match original shall be done by Contractor. Do not paint over name plates, serial numbers or other identifying marks.

1.14 ELECTRICAL WORK:

A. Power wiring to all electrically driven apparatus shall be done under the electrical contract. See Electrical Specifications.

B. Unless specifically noted otherwise on documents, Electrical Contractor shall furnish and install all magnetic starters including properly sized heaters, and disconnect switches as indicated on drawings or required by code.

C. The Contractor shall verify the proper operation of equipment furnished by him. Costs for repair, replacing, re-wiring and retesting shall be borne by the Contractor without additional costs to the Owner.

1.15 CONTRACTOR'S USE OF BUILDING EQUIPMENT:

A. The Contractor may use equipment when permanently installed as part of the project and with the written permission of the Owner. As each piece of equipment is used, maintenance procedures approved by the manufacturer shall be followed, a careful record shall be kept of the time used, maintenance procedure following and of any difficulty experienced with equipment. The Contractor's records on the equipment shall be submitted to the Owner upon acceptance of project. Any excessive wear noted shall require replacement.

1.16 INSPECTION NOTICE:

A. The following is a basic list of guideline items so that the Engineer and Owner’s representative can be at job site for these inspections as the building progresses. Mechanical Contractor shall inform these people one week in advance of test time.

1. Pressure tests on all water service piping.
2. Pressure tests on steam supply and condensate return piping.
3. The initial start-up of mechanical equipment, etc.
4. Any changes or problems occurring at job site.

5. Periodic inspection at their discretion will be made to insure compliance to Contract Documents and codes. Contractor shall provide ladders, access and other assistance as requested during inspections.
6. Final inspection before giving approval for final payment.

1.17 WARRANTY GUARANTEE:

A. The Contractor shall warrant all materials and equipment to be of quality consistent with specifications as represented by manufacturer's published data.

B. The Contractor shall guarantee that the installation and operation of the equipment shall be free from defects for a period of one year beginning at date of substantial completion and acceptance. The Contractor shall replace or repair any part of the installation that is found to be defective or incomplete within the guarantee period.

C. The one year guarantee on equipment and systems shall commence when equipment has been demonstrated to work and has been accepted. (Example: If an equipment item fails to perform and it takes 9 months after substantial completion to correct, then the guarantee shall commence after the item has been demonstrated to perform and has been accepted.)

D. Substantial completion and acceptance in no way relieves the Contractor from providing the systems and equipment as specified.

1.18 COMPLETION SCHEDULE:

A. Start-up and verification of basic equipment items shall be done prior to the date of substantial completion with sufficient time to allow balancing and adjusting to be performed.

B. At the time of the final inspection a date shall be agreed upon for completion of any remaining items. At least double the estimated cost of the work will be withheld from the Contractor's payment.

PART 2 - PRODUCTS
(Not Used)

PART 3 - EXECUTION
(Not Used)

END OF SECTION 15051

SECTION 15075 - PIPE AND EQUIPMENT IDENTIFICATION

PART 1 - GENERAL

1.1 SCOPE:

A. Piping Identification

1. All pipes new and existing shall be labeled and color coded with contents clearly identified and arrows indicating direction of flow. This applies to piping run above the ceilings, and in tunnels, as well as pipe exposed in finished areas. Pipes shall be identified at the following locations:

   a. Adjacent to each valve.
   b. At every point of entry and exit where piping passes through a wall or floor.
   c. On each riser and junction.
   d. A maximum of every 50 feet on long continuous lines fully exposed to view. Less spacing if one cannot see one code from the adjacent.
   e. Adjacent to all special fittings or devices regulating valves, etc.
   f. Connection to equipment.

PART 2 - MATERIALS

2.1 PIPING IDENTIFICATION:

A. Labels and markers shall be of the self-sticking, all-temperature permanent type as manufactured by W. H. Brady Co., 727 West Glendale Ave., Milwaukee, Wisconsin; or Seton Name Plate Corp., 592 Boulevard, New Haven, Connecticut.

B. Pipe color coding shall be uniform throughout the building and comply with requirements of ANSI A13.1.

C. All paint to be Enamel, Moore Impervo and Iron Clad.

D. Letters of identification legend and directional flow arrows shall be 2" high for pipes 3" and larger, and 1" high for pipes 2-1/2" and under.

E. Proposed identification system shall be approved by Owner and Engineer prior to installation.

PART 3 - EXECUTION

3.1 PIPING IDENTIFICATION:

A. Markers shall be installed in strict accordance with manufacturer's instructions. Use vinyl tape first and stick markers over tape. This procedure assures that the tape will not fall off.

B. On chalky and loose insulation, soft, porous, fiber-filled or fiberglass covering, a spiral wrap of pipe banding tape shall be made around the circumference of the pipe. Sufficient spiral wraps shall be made to accommodate the horizontal dimension of the pipe marker.

C. On bare pipes, painted pipes, and pipes insulated with a firm covering pipe banding tape matching the background color of the marker shall be used. After applying pipe markers, wrap pipe banding tape around pipe at each end of marker. Tape should cover 1/4" to 1/2" to 1" on itself. Be sure pipe surface is dry and free of dirt or grease before applying markers or banding tape.

D. Apply markers so they can be read from floor.

END OF SECTION 15075

SECTION 15083 - CULINARY WATER PIPE INSULATION

PART 1 - GENERAL

1.1 SCOPE:

A. Includes -

1. Insulating of all culinary hot water, recirculating hot water, and cold water lines and fittings.
2. The insulation products used on the project shall be of one manufacturer, unless specifically excepted. All pipe insulation shall meet the requirements of IBC.
3. Insulation products on this project shall be installed by a licensed insulation contractor using materials, and methods described in this section. Installation by other than an experienced licensed contractor shall not be acceptable.

PART 2 - PRODUCTS

2.1 INSULATION:

A. Snap-on glass fiber pipe insulation with surface burning characteristics as determined by ASTM E84 with a flame spread rating not to exceed 25 and smoke developed not to exceed 50.

B. Snap-on glass fiber pipe insulation. Heavy density pipe insulation with a factory applied ASJ vapor barrier jacket.

C. Approved Manufacturers:

1. Owens-Corning
2. Johns-Manville
3. Knauf

D. Thickness shall be as noted in Table 1.

2.2 COVERING:

A. Where piping insulation is exposed to public view, susceptible to damage, or routed below 6'0" above finished floor (excluding tunnels and crawl space), provide with pre-finished heavy duty aluminum jacket.

1. Jacket material shall be a standard weight and material for use as insulation jacketing and shall be smooth. Jacket shall be pre-finished with color selected by the owner’s representative.
2. Where piping is below 8'0" above finished floor in a public areas, jacket shall be secured with pop rivets. Where piping is above 8'0" above finished floor, or located in strictly mechanical areas, jacket shall be secured with screws.

PART 3 - EXECUTION

3.1 PIPING:

A. General

1. Pipe insulation shall be continuous through the sleeve.
2. An aluminum jacket shall be provided over the insulation wherever caulking is required.
3. Insulation shall be continuous through hangers.
4. Support points such as hangers shall have a calcium silicate support block or inserts as furnished by insulation manufacturer. See section 15101.

B. Cold Lines

1. Insulation shall be applied to clean, dry pipe with joints tightly butted and the ends of the insulation sealed off with vapor barrier coating at intervals not to exceed 15 feet.
2. Longitudinal laps of the jacket material shall overlap not less than 1-1/2 inches. Butt strips 3 inches wide shall be provided for circumferential joints.
3. All laps and butt strips shall be secured with adhesive and stapled on 4-inch centers.
4. Staples and seams, including those on self-sealing lap systems shall be coated with a vapor barrier coating.
5. Breaks and punctures in the jacket material shall be patched by wrapping a strip of jacket material around the pipe and securing it with adhesive, stapling, and coating as specified for butt strips. The patch shall extend not less than 1-1/2 inches past the break.
6. At penetrations such as thermometers, the void in the insulation shall be filled with vapor barrier coating and the penetration shall be sealed with a brush coat of the same coating.

C. Hot Lines

1. Insulation shall be applied to clean, dry pipe with joints tightly butted.
2. Longitudinal laps of the jacket material shall overlap not less than 1-1/2 inches, and butt strips 3 inches wide shall be provided for circumferential joints.
3. Laps and butt strips shall be secured with adhesive and stapled on 4-inch centers. Adhesive may be omitted where pipe is concealed.
4. Breaks and punctures in the jacket material shall be patched by wrapping a strip of jacket material around the pipe and cementing, stapling, and coating as noted for butt strips. Patch shall extend not less than 1-1/2 inches past the break.
5. The run of the line pipe insulation shall have the ends brought up to the item.
6. Penetrations such as thermometers, pressure gauges etc., the void in the insulation shall be filled with vapor barrier coating and the penetration shall be sealed with a brush coat of the same coating.

3.2 FITTINGS:

A. Insulate fittings with same type and thickness of insulation as pipe, with ends of insulation tucked snugly into throat of fitting and edges adjacent to pipe insulation tufted and tucked in or tapered.

B. Cover insulation with one piece "Zeston" type PVC fitting cover or equal by Ceel Company secured by stapling or taping ends to adjacent pipe covering.

C. Alternate Method -

1. Insulate fittings with one inch of insulating cement and vapor seal with two 1/8 inch wet coats of vapor barrier mastic reinforced with glass fabric extending two inches onto adjacent insulation.

TABLE 1
Pipe Insulation Thickness

PIPE SYSTEM	PIPE SIZE		
	LESS THAN 1"	1" TO 1-1/4"	1-1/2" TO 4"
HOT WATER	1/2"	1/2"	1"
COLD WATER	1/2"	1/2"	1"

END OF SECTION 15083

SECTION 15087 - STEAM AND CONDENSATE RETURN PIPING INSULATION

PART 1- GENERAL

1.1 SCOPE:

A. Includes -

1. Insulating of steam supply and condensate return piping, fittings and valves.

PART 2 - PRODUCTS

2.1 INSULATION:

A. Snap-on glass fiber pipe insulation with surface burning characteristics as determined by ASTM E84 with a flame spread rating not to exceed 25 and smoke developed not to exceed 50 when tested to IBC Standards.

B. All areas -

1. Insulation shall be Owens-Corning Heavy Density Sectional Pipe Insulation with FRJ Jacket with Self-Seal Lap or equal.

C. Approved Manufacturers -

1. Owens-Corning
2. Johns-Manville
3. Knauf

D. Thickness shall be as noted in Table 1.

2.2 COVERING:

A. Where piping insulation is exposed to public view, susceptible to damage, or routed below 6'0" above finished floor (excluding tunnels and crawl space), provide with pre-finished heavy duty aluminum jacket.

1. Jacket material shall be a standard weight and material for use as insulation jacketing and shall be smooth. Jacket shall be pre-finished with color selected by the owner’s representative.
2. Where piping is below 8'0" above finished floor in a public areas, jacket shall be secured with pop rivets. Where piping is above 8'0" above finished floor, or located in strictly mechanical areas, jacket shall be secured with screws.

PART 3 - EXECUTION

3.1 PIPING:

A. General

1. Pipe insulation shall be continuous through the sleeve.
2. An aluminum jacket shall be provided over the insulation wherever caulking is required.
3. Insulation shall be continuous through hangers.
4. Support points such as hangers or rollers shall have a calcium silicate blocks at point of support. See section 15101.
5. Insulation shall be applied to clean, dry pipe with joints tightly butted and the ends of the insulation sealed off with vapor barrier coating at intervals not to exceed 15 feet.
6. Longitudinal laps of the jacket material shall overlap not less than 1-1/2 inches. Butt strips 3 inches wide shall be provided for circumferential joints.
7. All laps and butt strips shall be secured with adhesive and stapled on 4-inch centers.
8. Staples and seams, including those on self-sealing lap systems shall be coated with a vapor barrier coating.
9. Breaks and punctures in the jacket material shall be patched by wrapping a strip of jacket material around the pipe and securing it with adhesive, stapling, and coating as specified for butt strips. The patch shall extend not less than 1-1/2 inches past the break.
10. At penetrations such as thermometers, the void in the insulation shall be filled with vapor barrier coating and the penetration shall be sealed with a brush coat of the same coating.

3.2 FITTINGS:

A. Insulate fittings with same type and thickness of insulation as pipe, with ends of insulation tucked snugly into throat of fitting and edges adjacent to pipe insulation tufted and tucked in or tapered.

B. Cover insulation with one piece "Zeston" PVC fitting cover secured by stapling or taping ends to adjacent pipe covering.

C. Alternate Method -

1. Insulate fittings with one inch of insulating cement and vapor seal with two 1/8 inch wet coats of vapor barrier mastic reinforced with glass fabric extending two inches onto adjacent insulation.

TABLE 1
Thickness of Pipe Insulation for Steam and Condensate Return Piping

PIPING SYSTEM	PIPE SIZES Insulation Thickness		
	UP TO 1"	1-1/4" TO 1-1/2"	2" AND LARGER
LOW PRESSURE STEAM	1-1/2"	1-1/2"	2"
MEDIUM PRESSURE STEAM	2-1/2"	3"	3"
HIGH PRESSURE STEAM	2-1/2"	3"	3"
CONDENSATE RETURN	1"	1"	1"

Note: Piping routed outside of building insulation envelope shall have insulation thickness increased by ½".

END OF SECTION 15087

SECTION 15101 - PIPE AND PIPE FITTINGS

PART 1 - GENERAL

1.1 RELATED SECTIONS:

A. Division 15010 General applies to this Section.

1.2 SCOPE:

A. Includes -

1. General piping installation, materials and procedures for all piping systems.

B. Related Work Specified Elsewhere -

1. Type of pipe and fittings for culinary water, steam and condensate return, etc. shall be specified in that particular Section.

PART 2 - PRODUCTS

2.1 HANGERS: (Hangers listed in this section are for pipe sizes and types not covered under section 15070. Contractor shall coordinate with Section 15070 supplier so as to not duplicate.)

A. Provide one of the following types of hangers for horizontal piping. Comparable products of Grinnell, Globe Pipehanger, B-Line, Michigan Hanger, Superstrut or Piping Technology and Products (PTP) considered equal.

B. Except as otherwise specified hereinafter: Clevis type, B-Line Fig. B3100.

C. Where pipe exceeds maximum loading recommended for Clevis type Hangers, provide steel pipe clamp, B-Line Fig. B3140 or Fig. B3142, depending on loading.

D. Provide trapeze hangers where several pipes can be installed parallel and at the same level. Trapeze hangers shall consist of 2 steel channels bolted back to back spaced for rod hangers at each end. Use roller chairs B-Line B3120 pipe roll stands B-Line B3117 SL where provision for expansion is required.

E. Supporting rods shall be attached to existing concrete for pipes up to 8 inches.

F. Supporting rods over 18 inches long shall be braced at every fourth hanger with diagonal bracing attached to slab or beam.

G. Spring hangers shall be used for support of pipe within 100 diameters distance of coils, or pumps, as needed to isolate vibration. Springs shall be sized 1" static deflection. Vibrex type HXAP-PC adjustable spring hangers.

H. For copper tubing use copper hanger; or dielectrically isolate.

2.2 FLOOR SUPPORTS:

A. Provide one of the following means of supporting horizontal piping from floor:

B. Pipe Saddle Support, B-Line, Fig. B3095 with pipe nipples to suit. Fasten to floor.

C. Where provision for expansion are required, pipe-roll stands, B-Line Fig. B3120 without vertical adjustment, B-Line Fig. B3122 with vertical adjustment as required. Provide concrete piers, fasten stands to piers.

2.3 WALL SUPPORTS:

A. Provide one of the following means of supporting horizontal piping from wall:

B. B-Line B-200 pipe clamp.

C. For hanger suspension, 750 pound maximum loading, light welded steel bracket with hole for one rod, 3/4 inch diameter. B-Line Fig. B3068.

D. For pipe roll stand support, welded-steel bracket, light for 700 pound maximum loading, B-Line Fig. B3063, medium for 1500 pound maximum loading Fig. B, heavy for 3000 pound maximum loading Fig. B3067.

2.4 VERTICAL PIPING SUPPORTS:

A. Vertical pipe supports shall be steel extension pipe clamps, B-Line Fig. B3373 or Fig. B3131, refer to manufacturer's rated maximum loading for each size pipe. Bolt clamp securely to pipe, rest clamp-end extension on building structure.

B. Where pipe sleeves extend above floor, place pipe clamps at ceiling below, support clamp-end extension from inserts.

2.5 CLAMPS:

A. Beam clamps shall be malleable iron, B-Line Fig. B442 for 1/4 inch hanger rods; forged steel beam clamp, B-Line B321 for hanger rod up to 1-1/2 inches.

2.6 PIPE COVERING PROTECTION:

A. Provide calcium silicate blocks in the bottom 1/2 diameter of pipe to protect insulation at areas of contact with hangers and supports. Material shall be 8 inches long for pipes up to 3 inches and 12 inches long for pipes 3-1/2 inches and larger. Insulation manufacturer supplied inserts shall be acceptable.

2.7 WALL AND CEILING PLATES:

A. Fit pipes passing through walls, floors, and ceiling with wall plates of proper size to cover openings around pipes. Plates will not be required at floor slabs where sleeves project above floor and space between pipe and sleeve is caulked and sealed. Plates shall be equal to Beaton and Cadwell No. 10, pressed steel

plates. Floor plates shall be chromium plated. Wall and ceiling plates shall be prime coated.

2.8 UNIONS AND COUPLINGS:

A. Unions: Malleable iron, brass to iron seat, ground joint, same materials as pipe. Crane, Walworth, or approved equal.

B. Dielectric Unions: Mechanical Contractor shall install dielectric union or couplings whenever copper pipe connects to steel pipe or other items of equipment. Couplings and unions shall be as manufactured by the Water Vallot Company of Detroit, Michigan, or approved equal. Union shall be installed in an accessible location.

2.9 PIPING SPECIALTIES:

A. Provide thermometers, pressure gages, vents, tank fittings, and other miscellaneous piping specialties as shown or as may be required by usual good practices for a complete system.

B. Thermometers shall be 9" scale, red reading, glass covered, immersion type with separable sockets. Marshall-Town, Trerice, Weskler, or Weiss, with neck extension to accommodate insulation.

C. Pressure gages shall be 4-1/2" diameter dial, liquid filled, molded case dust proof, phosphor bronze, bourdon tube type installed with integral check screw or pressure snubber. Marshalltown, U.S., Ashcroft, Trerice or Marsh.

2.10 STRAINERS:

A. Walworth 3699 - 1/2 Sarco SB; bronze, smaller than 2-1/2 inches. Bailey 125 pound No. 100; Zurn 125 pound No. 540 FPS; or Crane No. 989-1/2, cast iron 2-1/2 inches and larger. Water straining element shall be perforated 20 mesh monel screen. Strainers shall be designed for the same working pressure as the control valves. Provide strainer blowoff port with line size hose bibb and vacuum breakers.

2.11 VALVES:

A. Provide on each valve a name plate showing manufacturer, valve size, grade, and pressure temperature service rating.

B. See specific piping system sections for valves to be used in that system.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Furnish and install a complete system of piping, valved as indicated or as necessary to completely control entire apparatus. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to

be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper erection of systems of piping in every respect.

B. Properly support piping and make adequate provision for expansion, contraction, slope, and anchorage.

1. Cut piping accurately for fabrication to measurements established at site and work into place without springing or forcing.
2. Do not use pipe hooks, chains, or perforated metal for pipe support.
3. Remove burr and cutting slag from pipes.

C. Piping shall not interfere with removal of other equipment or devices nor shall it block access to doors, windows, or access openings. Provide accessible, ground joint unions in piping at connections to equipment.

D. Make connections of dissimilar metals with insulating couplings.

E. Provide sleeves around pipes passing through floors, walls, partitions, or structural members.

1. Seal sleeves with plastic or other acceptable material.
2. All piping passing through floors shall have a water tight sleeve and water tight caulking around pipe. Extend pipe sleeve minimum of 3 inch above floor.

F. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of systems. Do not use plugs of rags, wool, cotton waste, or similar materials.

G. Install piping systems so they may be easily drained.

H. Valves of same type shall be of same Manufacturer.

I. Do not use reducing bushings, street elbows, or close nipples.

J. Make changes in direction with proper fittings. Bending of pipe is not approved.

K. Hanger rods shall be of a diameter adequate to support pipe size.

L. Install additional supports as required.

M. Suspend all piping in building except that underground. Laying of piping on any building member is not allowed.

N. Design all hangers to support the required loads. Where necessary, supports shall be designed to permit movement due to expansion and contraction. Where drawings show details of supports and anchors, conform to details shown. Where details are not shown, conform to General Requirements specified in sub-paragraph.

O. Horizontal Piping Support Schedule: Support horizontal piping of steel, cast iron, plastic, and copper as follows:

HORIZONTAL PIPING SUPPORT SCHEDULE

Pipe Size	Rod Diameter	Maximum Spacing
Up to 1-1/4"	3/8"	6'-0"
1-1/2" and 2"	3/8"	10'-0"
2-1/2" and 3"	1/2"	10'-0"
4" and up	5/8"	12'-0"

P. Support horizontal lines of copper tubing with copper hangers. Space not more than 8 feet center to center.

Q. Cutting or other weakening of the building structure to facilitate installation will not be permitted. The Contractor shall demonstrate that no weight or stress is placed upon the equipment by the piping and that piping and connection of equipment are in perfect alignment. When so directed, disconnection and reconnection of piping shall be done by Contractor for designated pipe section to properly demonstrate stress; this shall be at no cost to Owner.

R. Flanges or unions as applicable for the type of piping specified shall be provided in the piping at connections to all items of equipment. All piping shall be installed to insure noiseless circulation. All valves and specialties shall be placed, packed and adjusted at the completion of the work before final acceptance.

S. Operating Valves shall be accessible for operation from floors or platforms where feasible, and handwheels shall not be more than 4'-6" above the floor or platform. In other cases, valves and cocks shall be equipped with chain operated handwheels or extension stems, or other suitable means of remote control.

1. Tighten glands and add additional gland packing as required before final inspection.

T. Provide sufficient clearance for insulated piping and fittings to permit application of insulation without cutting either pipe line covering or fitting coverings.

3.2 PIPE PROTECTION:

A. Do not run piping in outside wall, or where freezing may occur. Piping in attic spaces shall be run on the interior side of building insulation.

B. No water piping in building shall be in contact with earth.

C. All piping as installed shall be plugged or capped until equipment has been permanently connected.

3.2 GRADE AND DRAINAGE:

A. Domestic hot and cold water lines shall be graded so as to drain system with as few drains as possible. Drains shall be located in convenient and accessible places. All drainage piping shall extend to floor drains.

B. Steam lines shall be pitched 1" in 15 feet to drain to traps and condensate drain lines shall be pitched 1" to 15 feet to drain to condensate pumps.

3.3 CROSS CONNECTIONS:

A. No plumbing fixture, device or piping shall be installed which will provide a cross-connection or interconnection between a distributing water supply for drinking or domestic purposes and polluted source.

B. Provide all hose bibbs and equipped with a hose connection with a vacuum breaker.

3.4 FLEXIBLE CONNECTIONS:

A. Shall be provided wherever pipe connects to motor operated equipment.

3.5 DIELECTRIC FITTINGS:

A. Shall be used to connect dissimilar metals (such as steel and copper) to prevent electrolytic action.

3.6 PIPE JOINTING:

A. All steel pipe shall be joined by flanged, or screwed connections or by welding. Where welding is employed, welding type fittings with beveled ends shall be used. The mitering of pipes to form elbows and the notching of straight runs to form tees will not be allowed. All galvanized pipe shall be screwed. Copper pipe shall be soldered. All piping shall be cut to length by hack-saw or pipe cutter. Cutting of pipe with a torch will not be allowed.

B. Threaded Piping:

1. Threading shall be American-Standard taper pipe threads. Ream pipe ends and remove burrs after threading. Limit number of threads so that not more than two (2) threads will show beyond fitting.
2. All pipe joints shall be properly sealed with thread coatings applied to the male thread. Sealer for culinary water piping shall be Teflon tape. Sealer for steel pipe in heating, waste and vent lines shall be powdered graphite and Linseed oil or plumage and linseed oil or "Type-Unyte", or Teflon tape.

C. Soldered Piping:

1. Tubing shall be cut square and burrs removed. Both inside of fittings and outside of tubing shall be well cleaned with steel wool before sweating.

Care shall be taken to prevent annealing of fittings and hard drawn tubing when making connections. Joints for sweated fittings shall be made with a non-corrosive paste flux and solid wire solder. Use 95-5 or 96-4 Tin-Antimony solder. Cored solder will not be permitted.

D. Welding:

1. Welders shall be certified-

a. Welders shall be certified and shall bear evidence of certification within 30 days prior to commencing work on this project.
b. If there is any doubt as to the proficiency of the welder, the Owner may require the welder to take another test. This shall be done at no additional expense to the Owner.
c. Welders shall be certified in accordance with section IX of the ASME Boiler and Pressure Vessel Code by Pittsburgh Testing Laboratories or other Testing Agency acceptable to the Owner.

2. Piping 2" and larger shall be welded. Welding shall be done using either gas or electric welding equipment. No electric welding shall be done when the atmospheric temperature is below 40 degrees F. without first preheating the ends of the pipe. Thoroughly clean all piping surfaces before welding. The width of circumferential welds shall be 2-1/2 times the wall thickness of the pipe. Piping shall be securely aligned and spaced. The deposited metal shall form a gradual increase in thickness from the outside surface to the center of the weld. Make welds in at least two beads. Each shall be cleaned using stiff wire brushes or pointed descaling tools. The final beads shall be similarly cleaned for inspection.
3. Fittings -

a. All fittings shall be ASA Standard fittings and shall be of standard pipe thickness.
b. All elbows shall be long radius.
c. Wherever tee connections are made to piping systems on the main run, welding sockets shall be installed for the branch connections up to one half the size of the main run, welding tees shall be used.
d. The use of fittings formed from welded pipe sections and or notching of pipe will not be permitted. Changes in pipe size shall be made with tapered fittings.
e. Connection to equipment shall be flanged using std 150 psi weld neck flanges or flanges rated for pressure of system encountered. Gaskets shall be non-asbestos type of material suitable for temperature, pressure and substance in system.
f. All welding fittings used in welding system shall be manufactured by Tube Turns Inc., Taylor Forge and Pipe Works, Midwest Piping and Supply Co., or Bonney Forge and Tool Works, for “Weld-O-Lot” or Thread-O-Lot”, or approved equal fittings and shall match the pipe in which they are installed.

4. Safety precautions -

a. The contractor shall provide a fire proof mat or blanket to protect the structure, and adequate fie protection at all locations where welding is done.

5. Testing and acceptance -

a. Engineer and Owners Representative shall at their disgression shall inspect welds. If welds are found to be suspect, contractor shall provide testing of questionable welds at contractors expense.
b. Testing shall be by radiograph, ultrasonic, sectioning or a combination of these methods at the option of the Owner.
c. The contractor shall test a minimum of 6 welds up to a maximum of 1/4 of all welds on project as selected by Engineer.
d. Tests shall be preformed by a recognized independent testing agency acceptable to all parties. Agency shall submit a test report.
e. If defective joints are discovered Owner shall have right to require all welds removed and redone or remaining welds tested and all defective welds replaced. All work to test, remove and replace welds shall be at contractors expense.

3.7 FLASHINGS:

A. Wherever roof is pierced by work installed by this Contractor, he shall furnish and install proper flashings. All piercings of roof shall be sealed air and water tight.

B. 16 oz sheet copper flashings may be used in lieu of lead. Flashing shall be fitted snugly around pipe. Caulk between flashing and pipe to seal. Make water and air tight using a flexible waterproof compound. Base shall be 24" square.

3.8 PIPE CLEANING AND DISINFECTION:

A. All piping shall be flushed clean before connection to equipment. For specification cleaning requirements see individual piping sections.

3.9 PIPE TESTING:

A. Test all piping prior to painting, insulating, or concealment. Valve off or isolate controls, fittings, equipment or other piping which may be damaged by testing pressures. Provide relief valves set to avoid bursting pressure during test.

B. Domestic water, steam supply and condensate return piping shall be hydrostatically tested at 100 psi or 1 ½ times working pressure of medium being conveyed in piping with less than a four percent drop in pressure over a six hour period.

END OF SECTION 15101

SECTION 15140 - HOT AND COLD WATER PIPING SYSTEMS

PART 1 - GENERAL

1.1 SCOPE:

A. Includes -

1. Furnish and install all culinary hot, recirculating hot, and cold water piping shown on the drawings complete with necessary valves, connections, and accessories inside the building and connect into existing cold water service piping in the crawl space where shown on the drawings.
2. All water systems shall meet the requirements of ANSI/NSF Standard 61 Section 9 (1998), concerning metal contaminants in the water system.
3. Provide stainless steel piping or chrome plated copper piping where noted on the drawings and where routed exposed in finished space.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS:

A. Inside Building

1. Hot and cold water service piping: Type L, copper, hard drawn with wrought copper fittings.
2. Chrome plated piping (options)

    a. Provide chrome plated galvanized steel pipe sleeve over copper pipe wrapped with 2 layers of Scotch 33 plastic tape. Sleeve pipe shall be one pipe size larger than copper pipe outside diameter or
    b. Pipe shall be chrome plated by a firm that is in the business of chrome plating. Chrome finish shall be a bright or show finish or
    c. Type 304 stainless steel pipe and fittings. Piping shall have a polished type finish.

2.2 VALVES:

A. Interior culinary water valves shall be ball type, ¼ turn.

1. Con Bra Co “Apollo”
2. Hammond
3. Honeywell - Braukmann
4. Jenkins
5. Milwaukee
6. Nibco - Scott
7. Stockham
8. Watts

2.3 VACUUM BREAKERS AND BACKFLOW PREVENTERS:

A. Backflow preventers and vacuum breakers shall be installed in water lines to provide protection against cross contamination. Such devices shall be of approved manufacture and installed in accordance with the International Plumbing Code. Provide backflow preventers for:

1. Hose bibbs
2. Any fixture that accommodates a hose or tubing connection (i.e. faucets, etc.)
3. Any item required by code to have same

B. Backflow preventers, vacuum breakers and completed assembly shall comply with the International Plumbing Code.

2.4 HYDRAULIC SHOCK (WATER HAMMER) CONTROLS:

A. Provide hydraulic shock controls for flush valves and water header. Shock controls shall be Smith, Zurn, Wade, or Josam.

PART 3 - EXECUTION

3.1 INSTALLATION

A. For general piping installation, see Section 15101**.**

B. Piping Inside of Building

1. Provide valves on hot and cold water lines to each rest room for zone control of system. Provide access for all valves.
2. Do not run piping in outside walls or ceiling space unless it is located on the building side of insulation envelope.
3. Locate cold water piping a minimum of six inches from hot water piping.
4. Before pipes are covered, etc. Contractor shall test the piping installation in the presence of the Engineer, and Owners Representative. Piping shall be tested as described in Section 15101.

C. Pipe Sterilization and Disinfection

1. Sterilize the new domestic water system as described:

a. After the water system has been flushed clean, the shutoff valves to the 2nd floor shall be closed. All fixture outlets shall be opened slightly. A solution of sodium hypochlorite and clean water shall be introduced at the new tie-in to the existing water pipes downstream of new valve, until residual chlorine is detected at all water faucets, outlets, etc. The solution shall consist of 1 gallon of 5 percent sodium hypochlorite (Chlorox or Purex) to 200 gallons of water. The solution shall be flushed and all aerators and strainers shall be removed, cleaned, and replaced.

b. Contractor shall furnish to Owner and Engineer a written report certifying completion that pipe cleaning and disinfection has been completed and accepted.

2. After sterilization, flush solution from system with clean water until residual chlorine content is less than 0.2 parts per million.
3. Water system will not be accepted until a negative bacteriological test is made on water taken from system. Chlorine dosing shall be repeated as necessary until such negative test is accomplished.
4. When connecting into existing water lines, Contractor shall properly protect and cap the existing piping or Contractor shall stand the cost of cleaning and disinfecting the existing piping system to Owner's satisfaction.
5. Weber State University’s approved water treatment contractor is West Water and Energy Systems Technology Inc. P.O. Box 166, Kaysville, UT 84037. Phone 546-4031 Attn: Frank Leaver.

END OF SECTION 15140

SECTION 15150 - SOIL, WASTE AND VENT PIPING SYSTEM

PART 1 - GENERAL

1.1 SCOPE:

A. Includes -

1. This section only applies to the materials and piping required for connection into the existing waste and vent rainwater piping for the installation of the drinking fountains or removal and replacement of damaged soil, waste and vent piping.
2. Tie into existing waste and soil piping with same material as existing.

1.2 REFERENCES:

A. American Society for Testing and Materials

1. ASTM A 74-96, 'Standard Specification for Cast Iron Soil Pipe and Fittings'
2. ASTM C 564-95a, 'Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings'

PART 2 - PRODUCTS

2.1 Cast Iron Piping and Fittings

A. Above Grade Piping and Vent Lines

1. Approved Types -

a. Service weight, single-hub or no-hub type cast iron soil pipe meeting requirements of ASTM A 74.

1) Joint Material -

a) Single-Hub - Rubber gaskets meeting requirements of ASTM C 564.
b) No-Hub Pipe - Neoprene gaskets with stainless steel cinch bands.

2) Vent lines 2-1/2 inches or smaller may be Schedule 40 galvanized steel

B. Fittings

1. Cast Iron Pipe - Hub and spigot, except fittings for no-hub pipe shall be no-hub, and meet requirements of ASTM A 74.

a. Joint Material - Rubber gaskets meeting requirements of ASTM C 564.

2. Galvanized Pipe - Screwed Durham tarred drainage type.

PART 3 - EXECUTION

3.1 INSTALLATION

A. For general piping installation requirements, see Section 15101.

B. All Piping:

1. Regulatory Requirements

a. Install clean outs in accordance with local governing authority and State codes.

2. Performance Requirements

a. Failure to install joints between the new fixtures and existing piping properly shall be cause for rejection and replacement of piping system.

C. Metal Pipe and Fittings

1. Do not calk threaded work.
2. Use torque wrench to obtain proper tension in cinch bands when using hubless cast iron pipe. Butt ends of pipe against centering flange of coupling.

D. New drinking fountains shall have P-traps. Connect into the existing venting system so gasses pass freely to atmosphere with no pressure or syphon condition on water seal. Clean outs and plugs shall not be provided on P-traps.

E. Use torque wrench to obtain proper tension in cinch bands (above ground) when using hubless cast iron pipe. Butt ends of pipe against centering flange of coupling.

END OF SECTION 15150

SECTION 15185 - STEAM AND CONDENSATE RETURN PIPING AND SPECIALTIES

PART 1 - GENERAL

1.1 SCOPE

A. Includes furnishing and installing new steam supply and condensate return piping as shown on drawings.

B. Furnish and install traps on end of mains, drip legs and equipment where shown on the drawings or where required for proper operation of the system.

C. Connect to existing steam and condensate return piping in crawl space under the first floor and indicated on the drawings.

D. Related Sections

1. Division 15010, 15051 and Section 15101 apply to this section.

PART 2 - PRODUCTS

2.1 PIPING

A. Low pressure steam piping and fittings

1. Black steel schedule 40 pipe.

a. ASTM A120

2. Fittings

a. Steel fittings 125 psi screwed or butt welded with 125 psi flanges.
b. Valve rating shall be 125 psi.

B. Medium pressure steam piping and fittings.

1. Black steel schedule 80 pipe

a. ASTM A53
b. ASTM A120

2. Fittings

a. Steel fittings 300 psi screwed or butt welded with 300 psi flanges.
b. Valve rating shall be for steam at pressure encountered but no less than 150 psi.

C. Condensate return gravity flow and pumped piping and fittings.

1. Black steel schedule 80

a. ASTM A53

b. ASTM A120

2. Fittings

a. Steel fittings 300 psi screwed or butt welded with 300 psi flanges.
b. Valve rating shall be 125lb except where pressures encountered are greater then use valves rated for that pressure.

2.2 VALVES

A. Provide on each valve a name plate showing manufacturer, valve size, grade and pressure temperature service rating. Valve fluid bore shall match pipe size. All valves shall have renewable seats and discs, large deep stuffing boxes, packing glands and back seat on steam for repacking under pressure. Valves 2" and smaller shall be screwed connections. Valves 2'1/2" and larger shall be flanged. Manufacturers may be Crane, Walworth, Powell, Kitz, NIBCO, or approved equal by Owner.

B. General Purpose -

1. Ball valves 2 inches and smaller shall be Walworth, Crane, Powell, NIBCO, Watts or Milwaukee.
2. Valves 2 1/2 inches and larger shall be butterfly and manufactured by Walworth, Crane, Powell.
5. Check Valves Smaller than 2-1/2 Inches: Crane 372
6. Check Valves 2-1/2 Inches and Larger: Crane 373
7. Valve shall be of proper size and type for temperature, pressure, and fluid encountered.

C. Radiator Valve

1. Manual Steam Radiator Valves -

a. Heavy red brass with stuffing box glands or followers
b. Rough bodies
c. Finished trimmings
d. Nickel - plated
e. Designed to permit repacking when wide open and under pressure
f. Fitted with renewable discs
g. Provided with large composition non-breakable hand wheels
h. Ball joint union connections
i. Suitable for steam working pressure of 25 psi
j. Straightway, offset, or corner angle pattern as dictated at Project.
k. Approved Manufacturers -

1) Armstrong
2) Illinois Series 55
3) Mepco

2.3 TRAPS

A. Inverted Bucket Traps: Traps for condensate of saturated steam over 15 psig shall have capacities of no less than 200 lbs condensate per hour with an inlet pressure of 40 psig and a pressure differential across trap of 20 psig.

1. Bucket traps shall be either of the inverted or vertical type, with automatic air discharge, and shall have a heavy body of fine-grained cast iron, brass bucket, bronze mechanism, and corrosion-resistant stainless steel valves and seats.
2. Traps shall have a working pressure of 125 psig saturated steam pressure and in all details not specified above shall equal RP&C, Barnes and Jones, Armstrong, Sarco, or Hoffman.
3. Use bucket traps for medium pressure steam system.

B. Float and thermostatic traps shall be suitable for 15 psig steam working pressure. Install in ends of low pressure steam mains, at points where the steam main rises, and at all other points where shown or required for proper operation of system.

1. Materials shall be as follows:

    a. Float - copper alloy
    b. Float valve and seat - Monel metal, or stainless steel
    c. Body - renewable gray cast-iron, covers removable without disturbing piping connections.

2. Capacities of the traps shall be with 5 psig pressure at the trap inlet and a differential pressure across the trap of 2 psig unless otherwise noted. Traps shall have capacity of 200 lbs per hour unless noted otherwise.
3. Traps shall be Barnes & Jones, RP&C, Armstrong, Sarco, or Hoffman.

C. Radiator thermostatic type

1. Thermostatic Traps -

    a. Rugged brass construction with union inlet.
    b. Duplex phosphor bronze diaphragm
    c. Stainless steel valve cone and seat.
    d. Diaphragms and seats both replaceable.
    e. Rated for 25 psig to 25 inches vacuum.
    f. Approved Manufacturers -

        1) Armstrong
        2) Illinois Series G
        3) Mepco
        4) Spirax / Sarco
        5) Hoffman

PART 3 - EXECUTION

3.1 INSTALLATION

A. See section 15101 for general piping installation procedures.

3.2 PIPE CLEANING

A. Clean and flush all new steam and condensate return piping using a liquid alkaline cleaning agent.

B. Weber State University's approved water treatment contractor is West Water and Energy Systems Technology Inc. P.O. Box 166, Kaysville, UT 84037. Phone 546-4031 Attn: Frank Leaver.

3.3 TESTING

A. Conduct tests in presence of Engineer.

B. Tests shall be as described in Section 15101.

END OF SECTION 15185

SECTION 15410 - PLUMBING FIXTURES AND TRIM

PART 1 - GENERAL

1.1 SCOPE

A. Division 15010 and 15051 applies to this Section.

B. Interior exposed pipe, valves, and fixture trim shall be chrome plated.

C. Complete installation of each new drinking fountain and their connections to existing waste and vent piping and new cold water piping including P-trap and accessories with accessible stop valve in cold water branch supply line.

D. Polish chrome finish at completion of Project.

E. Both drinking fountains shall be all of one type.

F. Install drinking fountains and fittings per IPC and WSU standards. Drinking fountains shall be mounted level.

G. Do not use flexible water piping.

H. Installation of drinking fountains and trim shall comply with the requirements of ANSI/NSF 61 Section 9, (1998). Every box containing such component shall carry a notice of compliance including Testing Lavatory providing classification/certification and control number.

PART 2 - PRODUCTS

2.1 FIXTURES

(Not Used - See section 15416)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install drinking fountains in existing locations as existing removed units.

END OF SECTION 15410

SECTION 15416 - DRINKING WATER COOLING SYSTEMS

PART 1- GENERAL

1.1 SUMMARY

A. Includes But Not Limited To

1. Furnish and install drinking water cooling system units as described in Contract Documents. These will be replacement fixtures. See schedule on drawings.

B. Related Sections

1. Section 15010 & 15051 - General Mechanical Requirement.
2. Section 15140 - Ho and Cold Water System

PART 2- PRODUCTS

2.1 GENERAL

A. Interior exposed pipe, valves, and fixture trim shall be chrome plated.

B. Do not use flexible water piping.

2.2 MANUFACTURED UNITS

A. Handicap Accessible Single Fountain

1. Vandal proof operating bar on front and both sides. 7.8 GPH minimum of 50 deg F water with 90 deg F room temperature, 1**/**5 horsepower compressor motor, 120 V, 60 Hz, single phase. One piece, 24" x 36" stainless steel back splash and basin. See drawings. Flexi-guard or chrome plated brass bubbler.
2. Approved Manufacturers and Models:

a) Elkay - EBFSA-8.
b) Prior approved equal.

PART 3- EXECUTION

3.1 INSTALLATION

A. Install fixtures with accessible stop or control valve.

B. Mounting

1. Coordinate location of fountain with location and height of electrical outlet to ensure concealment of outlet by fountain.
2. Handicap Accessible Single Fountain -

a) Anchor bottom of fountain to wall.
b) Top surface to be 32 inches above floor unless required otherwise. Bottom of fixture overhang to be 27 inches above floor.
c) Install 3/8 inch IPS union connection and Chicago No. 376 stop to building supply line.
d) Install 1-1/4 inch IPS slip cast brass 'P' trap. Install trap so it is concealed.

3.2 CLEANING AND FINISHING

A. Polish chrome finish at completion of Project.

B. If new drinking fountains do not cover the wall pattern left by the removal of the existing fountain, contractor shall seal all wall openings and finish wall with the same material as existing. Paint if required.

END OF SECTION 15416

SECTION 15762 - CONVECTORS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To

1. Furnish convectors as described and scheduled in the Contract Documents.

B. Related Sections

1. Section 15055 - General Mechanical Requirements
2. Section 15185 - Steam & Condensate Return Piping and Specialties

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Convectors

1. Size using Commercial Standard CS-140-47 and include rating in catalog literature.
2. Enclosures -

   a. Constructed of 18 ga first grade furniture steel.
   b. With 16 ga removable front panels.
   c. With baked enamel finish, color as selected by Architect.
   d. Provide manual damper and semi-recessed intake grille.

3. Heating Elements -

   a. Seamless copper tubes hydraulically expanded to flat aluminum fins to form permanent bond between tube and fin.
   b. Silver solder tubes to cast iron header.

4. Approved Manufacturers:

   a. Airtherm
   b. Sterling
   c. Trane

2.2 ACCESSORIES

A. Self-Contained Valves

1. Provide with valve mounted adjustment and remote sensor or valve mounted sensor with security guard as required.
2. Approved Manufacturers -

a. Danfoss Model RA-2000
b. Tour & Anderson Model RVT

2.3 SOURCE QUALITY CONTROL

A. Test complete unit to withstand hydrostatic pressure test of 150 psi.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Convectors - Anchor units securely in place. Install per manufacturers recommendations. See convectors installed on 1st floor.

B. Self-Contained Valves - Install on new convector located on the 2nd floor.

END OF SECTION 15762

SECTION 15765 - CABINET UNIT HEATER

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To

1. Furnish and install cabinet heaters as described in Contract Documents.

B. Related Sections

1. Section 15055 - General Mechanical Requirements
2. Section 15100 - Building Services Piping and installation

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Cabinet Heater

1. Floor mounted, upflow discharge, 16 gauge steel cabinet, complete with inlet and outlet grilles, key lock access doors for valves and controls. Heating coil shall be steam type and factory equipped with -

   a. Fan speed control 'OFF-HIGH-MEDIUM-LOW'
   b. Internal adjustable thermostat

2. Fan shall be forward curved with double inlet, mounted on motor shaft, and dynamically and statically balanced.
3. Provide access panels for servicing motor and fans.
4. Multi-speed fan motor shall be factory lubricated, have internal overload protection, and be resiliently mounted.
5. Approved Manufacturers -

   a. Trane
   b. Airtherm
   c. Sterling

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install per manufacturers recommendations. See installation of cabinet heaters on first floor.

END OF SECTION 15765

SECTION 15935 FACILITY MANAGEMENT SYSTEM

PART 1 - GENERAL

1.1 GENERAL CONDITIONS:

A. All pertinent sections of Section 15010 and 15051, Division 16, are a part of the work described in this section. Division 1 is a part of this and all other sections of these specifications.

1.2 SCOPE OF WORK:

A. The FMS shall be an extension of the existing Johnson Controls Metasys system. This contractor shall provide coordination with WSU to insure seamless integration of new equipment being added under this scope of work.

B. All line and low voltage control wiring for the FMS shall be installed in accordance with the National Electric Code, Local Codes, and Division 16 specifications.

C. This contractor shall carefully review all notes, coordination schedules, and drawings for work required under this section of the specification. If there is a discrepancy between the drawings, specifications, point list, and/or sequences of operation the most stringent shall apply.

D. Adjustment and validation of control system. Instruction of Owner's representative on maintenance and operation of control equipment.

E. Composite diagrams showing interlocks between equipment furnished under this and other sections.

F. This system shall include but not be limited to controls and equipment as hereinafter specified:

1. Steam Convectors
2. Cabinet Unit Heaters

1.3 EXECUTION:

A. Related work in other sections:

1. The following incidental work shall be furnished by the designated contractor under the supervision of the Temperature Control Contractor:

a. The Mechanical Contractor shall:

1) Install automatic valves, and separable wells that are specified to be supplied by the temperature control contractor.
2) Demolition of existing control valves.

3) Furnish and install all necessary piping connections required for flow devices.
4) Provide coordination with the control contractor for equipment interface.

B. Performance:

1. The FMS contractor shall have an established 24 hour emergency service organization. A dedicated telephone number shall be provided to the owner for requesting emergency service. A maximum of four hour, electronic service technician on sight, response time shall be guaranteed by the FMS contractor.
2. Qualified Contractors: Johnson Controls, Inc. - Salt Lake City Branch Office. Contact Brian Connolly @ 801/974-4546 for questions and quotation.

C. Submittals:

1. The requirements of this section shall be strictly adhered to. The engineer has allowed for two submittals reviews. If the submittals are not approved after these two reviews, all additional reviews will be at the expense of this contractor.
2. The FMS Contractor shall submit within 30 days after award installation drawings and control strategies for review.
3. Each submittals shall have a cover sheet with the following information provided: submittals ID number; date; project name, address, and title; FMS Contractor name, address and phone number; FMS Contractor project manager, and project engineer names and phone numbers.
4. The following shall be submitted for approval:

   a. Data sheets for all control systems and components.
   b. Control Damper Schedules. This spreadsheet type schedule shall include a separate line for each damper and a column for each of the damper attributes, including: Code Number, Fail Position, Damper Type, Damper Operator, Blade Type, Bearing Type, Seals, Duct Size, Damper Size, Mounting, and Actuator Type.
   c. Control Valve Schedules. This spreadsheet type schedule shall include a separate line for each valve and a column for each of the valve attributes, including: Code Number, Configuration, Fail Position, Pipe Size, Valve Size, Body Configuration, Close off Pressure, Capacity, Valve CV, Calc CV, Design Pressure, Actual Pressure, and Actuator Type.
   d. Control system drawings containing pertinent data to provide a functional operating system, including a sequence of operation. Detailed shop drawings may be submitted in as-built form upon project completion.
   e. FMS riser diagram showing all DDC controllers, operator workstations, network repeaters, and network wiring.
   f. Each control system drawing shall contain the controlled equipment layout diagram, sequence of operation, and bill of material on the same page for ease of review and owner use.

g. Points list for each DDC controller, including: Tag, Point Type, System Name, Object Name, Expanded ID, Display Units, Controller Type, Address, Cable Destination, Module Type, Terminal ID, Panel, Slot Number, Reference Drawing, and Cable Number.

h. Vendor's own written description for each sequence of operations, to include the following:

1) Sequences shall reference input/output and software parameters by name and description.
2) The sequences of operations provided in the submittals by the FMS Contractor shall represent the detailed analysis needed to create actual programming code from the design documents.
3) Points shall be referenced by name, including all software points such as programmable setpoints, range limits, time delays, and so forth.
4) The sequence of operations shall cover normal operation and operation under the various alarm conditions applicable to that system.

i. Submit six (6) complete sets of documentation.

5. FMS Contractor shall not order material or begin fabrication or field installation until receiving authorization to proceed in the form of an approved submittals. FMS Contractor shall be solely responsible for the removal and replacement of any item not approved by submittals at no cost to the Owner.

D. O&M Manuals

1. Submit four sets of each manual.

a. Include the following documentation in the Hardware Manual:

1) General description and cut sheets for all components.
2) Detailed wiring and installation illustrations and complete calibration procedures for each field and panel device.
3) Complete trouble-shooting procedures and guidelines.
4) Complete operating instructions for all systems.
5) Maintenance Instructions: Document all maintenance and repair/replacement procedures.

b. Include the following documentation in the DDC Software Manual:

1) Sequence of Operations
2) Program Listing of Software Source Code OR Flow Chart Diagrams of Programming Objects.
3) Printed listing of controller and operator workstation database files.

4) Software Point Name Abbreviation List.. Include Name, Description, Controller Where Located, Point Type and Point ID.
5) I/O Point List. Include Point Name, Controller Location, Point Number, Control Device, Range and Span.
6) Printouts of all; Reports, Group Listings and Alarm Messages.
7) Index of all DDC point names with documentation manual page number references.

c. Provide four copies of all manufacturers manuals covering the installed system. This shall include, as a minimum:

1) System Engineering Manual
2) System Installation Manual
3) Programming Manual
4) Engineering and Troubleshooting Bulletins
5) Operator Workstation Software Manual
6) All other pertinent manuals published by the control system manufacturer

d. All manuals shall be provided on a single Compact Disk (CD) as part of an on-line documentation system through the operator workstation.
e. Submit four (4) copies of Instrument Check-Off sheets including:

1) Installation verification of all I/O points signed and dated by the installer that performed the work.

f. Submit four (4) copies of Software Check-Off sheets including:

1) Software verification checkoff sheets verifying functional operation in accordance with the sequence of operation signed and dated by the technician that performed the work.

E. Wiring:

1. Electric wiring and wiring connections required for the installation of the temperature control system as herein specified, shall be provided by the Temperature Control Contractor unless specifically shown on the drawings or called for in the specifications to be by the Electrical Contractor.
2. All line and low voltage wiring shall be installed in accordance with the local and national electrical codes and Division 16 specifications. All mechanical, concealed inaccessible, and exposed areas shall be installed in conduit. Plenum rated cable may be installed in accessible areas above ceilings.
3. All conduit for this project shall be a minimum of 3/4".
4. Wiring shall be neatly tied to building structure. Do not support wiring and cables from piping, conduit, or other devices. Do not lay wiring on ceiling tile.

5. All cable shall be minimum 18 awg twisted shielded.
6. All cabling including communication cabling, binary inputs, binary outputs, analog inputs and analog outputs shall be labeled at least every 2 feet with the communication type and/or I/O designation type. (Example: analog in = AI, analog output = AO, binary in = BI, binary out = BO, communication = Company Name + Communication Type.)

F. Tubing:

1. Reuse existing pneumatic lines. The intent of this project is to replace the pneumatic steam radiator valves and reuse all pneumatic tubing.
2. Notify WSU and engineer (Win Packer @ WHW) if faulty pneumatic lines are discovered.

G. Warranty:

1. Upon completion of the project as defined either by acceptance of the building by the Owner or by beneficial use of the equipment by the Owner, a warranty period of one year shall commence. The warranty shall consist of a commitment by the Automatic Temperature Control Contractor to provide at no cost to the Owner, parts and labor as required to repair or replace such parts of the temperature control system that prove inoperative due to defective materials or installation practices. This warranty expressly excludes routine service such as filter cartridge replacement, compressor lubrication or instrument calibration.

H. Training:

1. Provide 2 hours of onsite training to familiarize campus personnel with new equipment being added under this project.

PART 2 - PRODUCTS

2.1 FMS DESCRIPTION:

A. The FMS system is an extension of the existing Johnson Control Metasys System. This contractor shall modify all existing operator workstations to incorporate new equipment being added under this project.

2.2 FMS ARCHITECTURE:

A. The FMS system is an extension of the existing Johnson Control Metasys System. This contractor shall extend the N2 communication trunk from the existing Network Control Module located in the building.

2.3 OPERATOR INTERFACE:

A. The operator workstations are existing and shall be reused. Modify existing Network Control Units and Operator Workstations to include new controllers added.

2.4 APPLICATION SPECIFIC CONTROLLERS (GENERAL):

A. Each ASC shall operate as a standalone controller capable of performing its specified control responsibilities independently of other controllers. Each ASC shall be a microprocessor-based, multi-tasking, real-time digital control processor.

B. Each ASC shall have sufficient memory to support its own operating system and data bases including:

1. Generic Input/Output Monitor and Control
2. Control Processes
3. Energy Management Applications
4. Operator I/O (Portable Service Terminal)

C. Application Specific Controllers shall directly support the temporary use of a portable service terminal.

D. Powerfail Protection: All system setpoints, proportional bands, control algorithms, and any other programmable parameters shall be stored such that a power failure of any duration does not necessitate reprogramming the controller.

2.5 UNITARY CONTROLLERS:

A. Unitary conditions shall support stand alone software configured control strategies, or generic monitor and control for future expansion or retrofit for: JCI Model AS-UNT111-1 or AS-UNT1144-0.

2.6 TEMPERATURE SENSORS:

A. Temperature sensors shall be linear precision elements with ranges appropriate for applications, accurate within 1 Deg F over the entire span.

B. Provide pneumatic thermostats to match existing where shown on drawings. Provide new pneumatic thermostats to match existing where existing thermostats need repairs.

C. Thermowells for all immersion sensors shall be stainless steel or brass as required for each application.

2.7 CONTROL VALVES:

A. All automatic control valves shall be fully proportioning with modulating plugs for equal percentage of linear flow characteristics. The valves shall be sized by the control manufacturer and by provided with actuators of sufficient power for the duty intended. Valve body and actuator selection shall be sufficient to handle system pressure and shall close against the differential pressure liable to be encountered on the project.

B. General: Control Valves up to 4 inch shall be properly sized for the associated equipment. Valves shall be packless, modulating, electrically or pneumatically

actuated. These valves shall have a true linear flow characteristics in relationship to valve opening. This Warranty shall cover all required maintenance and failures. In the event of a failure the valve and actuator shall be replaced and reinstalled, by the controls contractor, at no cost to the building owner.

C. Terminal Unit Valves, ½ Inch to 1 Inch: Valves shall be properly sized for the associated equipment. Valve body shall be nickel plated brass. Two position valves shall not be allowed except for radiation valves.

D. Butterfly Valves: Shall be capable of drop tight service to 175 psi (2-12") and 150 psi (12-20") when installed between flanges. Valve body shall be wafer lug style and be drilled and tapped to ANSI class 125/150 flange standards.

E. Replace existing pneumatic finned tube radiators control valves with new as required. Johnson Controls Model VG7000 series with 3-6# actuators.

2.8 MISCELLANEOUS:

A. All necessary relays and signal boosters shall be furnished to make the system a full and operable system as required by the sequence of operation.

PART 3 - EXECUTION

A. Installation

1. Install per manufacturer’s recommendations and in such a manner as to meet the sequences of operation as described in section 15940.

B. Provide a unit price to provide new pneumatic thermostats as necessary. Include pneumatic tubing, system verification, trouble shooting, etc.

END OF SECTION 15935

SECTION 15940 - SEQUENCE OF OPERATION

PART 1 -
(Not Used)

PART 2 -
(Not Used)

PART 3 - EXECUTION

3.1 STEAM SYSTEM:

A. Installed during phase 1.

3.2 FINNED TUBE RADIATORS

A. This contractor shall provide new pneumatic control valves on each new 2nd floor convector and connect to new pneumatic thermostats reuse existing pneumatic tubing.

3.4 DDC MONITORING

A. Provide DDC temperature monitoring at 4 different locations on 2nd floor of building #4. Coordinate locations with owner and supplier.

3.5 UNIT COSTS

A. Unit costs #2: Provide a unit cost for replacement of existing thermostats if it is determined that the existing thermostat is not functional. Provide a cost per thermostat including equipment, labor, diagnostics, pneumatic tubing, etc.

END OF SECTION 15940